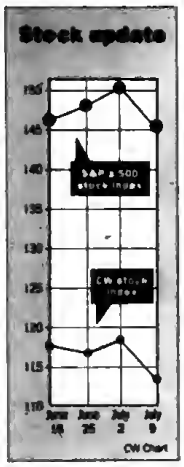
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

COMPUTERWORLD

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Wang Laboratories cuts an additional 1,600 jobs, mainly through retirement incentives. **Page 134.**

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Control Data revamps Cyber 180 line with boosted memory and lower costs. **Page 4.**

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GEISCO scraps bank clearinghouse scheme and blasts the Fed's policies **Page 9.**

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Hewlett-Packard HP 3000 users are anxious to buy Spectrum models. **Page 2.**

■

Computervision offers conversion tools to aid users porting its CADDS software to workstations. **Page 19.**

■

Honeywell laid off 75 employees late last week in the manufacturing operation of its Phoenix-based Large Computer Products division. A source inside the division said some 400 additional jobs will be cut within the next two months, but a company spokeswoman denied that any further reductions are planned. The demand for Honeywell's manufacturing resources has been lowered by the firm's private labeling of NEC mainframes as its DPS 90 series.

■

ADAPSO last week discarded its controversial hardware-based lock-and-key proposal for combating micro software piracy, because of an underwhelming response from vendors and users [CW, Jan. 13]. The software trade group distributed more than 1,500 copies of the proposed standard, but fewer than 100 ballots were returned. "It is clear that interest in developing this type of technical protection standard has dwindled in the last 12 months," said Jerome L. Dreyer, ADAPSO president.

■

AT&T's laptop plans are on permanent hold, an industry source claims. The company has several prototypes under development but has no plans for introduction or production in the foreseeable future.

See **NEWS** page 9

Owners resist filing net info

Disclosure of proprietary plans feared in Utah ruling

By Elisabeth Horwitt

SALT LAKE CITY — Private network owners and operators are fighting a proposed state agency rule that would require businesses to disclose proprietary information about their communications facilities.

Critics claim the Utah Public Service Commission is intruding on private business and that reporting requirements would be expensive. They charge the rule would ultimately force companies to make public sensitive details regarding their internal communications systems. This would effectively provide the companies'

See **OWNERS** page 8

Cobol standard add-ons flayed

By Charles Babcock

A committee of the American National Standards Institute this week will launch a process to add features to Cobol without waiting for another full revision of the language. If the process gathers momentum, it will cause horrendous implementation problems for compiler vendors and users, one committee member charges.

If approved, the controversial addendum procedure will allow ANSI's X3J4 committee to add features to the language more quickly than with the standard update. ANSI's Cobol 85 standard, for example, took 11 years to complete.

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Lotus aims at micro-MIS data transfer

By Douglas Barney

NEW YORK — Marking its long-expected move from desktop dominance to an all-out assault on MIS shops, Lotus Development Corp. last week announced a line of software products that allow personal computers to extract data from a variety of mainframe applications.

The IBM mainframe-oriented modules of The Application Connection, which are enhanced versions of the Ilink products acquired from Infocenter Software, translate data from mainframe application formats to PC formats. With TAC, both the tedious job of rekeying mainframe data into PC spreadsheets and the need to write data extraction programs are eliminated, Lotus claimed. In addition, data can be uploaded into mainframe data bases and applications.

Lotus founder Mitch Kapor resigns, opts for "unstructured" lifestyle. **Page 6.**

TAC will be available in September, and a typical configuration involving two mainframe applications will cost roughly $30,000.

In a radical departure from Lotus' previous policy of selling products exclusively through computer dealers, Lotus will sell TAC directly through a 50-person sales force and will select value-added resellers with experience in the mainframe world.

"TAC is a positive step. It allows Lotus salesmen to walk into a large corporation with a checklist of things. It is a very powerful selling tool that emphasizes the fact that Lotus' 1-2-3 is a corporate standard," said Bob Therrien, a member of Paine Web-

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CW SPECIAL REPORT

Micro managers: Changing role demands business acumen

By David Bright

Much as the MIS manager's role has changed in recent years, the job of microcomputer manager today is quickly evolving from that of personal computer specialist to corporate assets manager. Today, instead of simply installing one PC after another, micro managers are increasingly expected to be sensitive to the overall strategic direction of the business and to contribute to the bottom line.

For example, John Sykes, office automation manager at Lummus Crest, Inc., a Bloomfield, N.J.-based engineering and construction subsidiary of Combustion Engineering, Inc., is often called upon to participate in contract proposals that could lead to multimillion-dollar contracts for his company.

By taking an active interest in engineering and construction as well as in end-user computing, Sykes says he is better able to help set up reports and graphics within contract proposals because he has a clearer idea of what the potential clients are looking for.



Manager Sykes

Sykes warns his peers not to fall into the shortsighted trap of concentrating on the installation of "a PC here, a printer there."

When information centers were coming into vogue three years ago, the mandate at many corporations "was really just to get an available body," according to Sykes.

At that time, Sykes recalls, microcomputer managers could write their own job descriptions. If a person had some technical expertise — say, a background in mainframe systems analysis — and an interest in PCs, he was in demand as a corporate PC coordinator. That is no longer the case.

Since the typical microcomputer manager has installed hundreds of corporate PCs and Lotus Development Corp. 1-2-3 packages and taught a good number of corporate personnel how to use the technology, that manager has become

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NEWSPAPER

Users eager for Series 930, first HP Spectrum machine

Survey says about 240 orders will be placed

By Maura McEnaney and Donna Raimondi

With less than six months to go before Hewlett-Packard Co.'s high-performance Spectrum machines head out the door, customers seem anxious for their arrival.

Since its February debut, HP's line of products based on reduced instruction set computing (RISC) architecture has garnered much interest. Although HP is keeping quiet about orders for the Series 930 — the first Spectrum machine slated to ship by year's end — early indications point to a positive user response.

"Users of the current HP 3000 line have a tremendous pent-up demand and have been waiting a long time for the new processing techniques," says Don Lewis, vice-president of information resources at Allegheny Beverage Co. in Cheverly, Md.

Evaluating Spectrum

Allegheny has been evaluating Spectrum for use by some of its subsidiaries, among them a food and vending company, retail furniture stores, coin-operated laundromats and a building and cleaning supplies company. Allegheny now uses six HP 3000s in its telemarketing program and for office functions such as word processing and accounting.

Approximately 12% of the users of high-end HP 3000 Series 64 and 68 systems plans to acquire a Spectrum by the end of next year, according to a recent survey by Framingham, Mass.-based International Data Corp. (IDC). IDC's survey of 100 HP 3000 users also found that approximately 30% of the respondents this year will upgrade to the new HP 3000 Series 70. Announced along with the release of the first two Spectrum products in February, the Series 70 incorporates traditional HP architecture and is said to provide a 20% to 35% performance increase over the Series 68.

A 12% purchase rate means delivery of about 240 machines, and a price tag of about $225,000 translates into more than $54 million in sales, all of which should boost HP's bottom line.

But some observers are skeptical about the number of projected Spectrum orders. "That's a significant number of machines," notes consultant Omri Serlin of Itom International Co. in Los Gatos, Calif. "In view of the fact the machine isn't going to ship until December, I don't see why so many people would commit at this point."

Users point to two main reasons for waiting patiently for the Spectrum machines. "We have not considered leaving HP at all," says Richard T. Schwartz, director of MIS at communications products company General Datacomm Industries, Inc. in Middlebury, Conn. "It is an integrated part of our infrastructure. For us to move to a different vendor would be prohibitively expensive at this point."

Another reason for staying with HP is that its hardware is "bullet-proof," according to John Proffitt, data processing manager at Hitco, an aerospace manufacturer in Gardena, Calif. "I have worked around for a few years, and I can't believe how reliable and dependable the HP hardware is. You can't break that machine."

Forest Evans, information systems manager at Evenflo Juvenile Furniture Co. in Piqua, Ohio, agrees. "HP is cost-effective, reliable, easy to run, easy to put new applications on. That is why people are loyal."

At Kirke-Van Orsdel, Inc. in Des Moines, Iowa, the simple need for more horsepower forced the insurance brokerage firm to place its early order for a Spectrum Series 930.

"We have a Spectrum 930 on order for the first quarter of 1987, and we intend to take delivery," systems development specialist Thomas Evans told *Computerworld*. "We were between a rock and a hard place. Our machine usage was up to about 95% during the day, and that made our response time very low."

In May, Kirke-Van Orsdel installed two Series 70 upgrades, which process data for various insurance carriers. According to Evans, the company's increased processing needs left little choice but to buy a Spectrum. "It was either that or order another 3000," he says.

Other users interviewed by *Computerworld* say it may be a few years before they order HP's RISC-based machines.

A Series 930 could make its way to H. P. Metzler & Sons by 1988, according to MIS director Bill Hardy. The Del Rey, Calif., agricultural organization has a Series 68 and plans to upgrade to the Series 70 in about six months.

Hardy is the former manager of computer services at HP and worked with one of the company's in-house Series 930s. "The 930 is every bit as good as the competition's right now," Hardy says. "It is miles ahead of Data General Corp., and although Digital Equipment Corp. has features like speed of processing which are better than HP's, the HP machine is easier to use and easier to get applications up on," he notes.

Wait-and-see attitude

General Datacomm's Schwartz is taking a wait-and-see attitude on his company's Spectrum purchase.

He currently has three networked Series 68 machines, a Series 42 in Toronto and a Series 39 in London. Within 12 months, the company expects to buy the Series 70 upgrade.

Schwartz said he is likely to bypass the Series 930 and purchase the Series 950 — said to have three times the system throughput of the Series 68 — within three years. He plans to hang on to the company's Series 68s.

"We have definitely looked into the Spectrum machines. I'm reasonably comfortable with the hardware but not with the software," comments Schwartz, who says he thinks converting applications to a new operating system data base management system could be cumbersome. "I don't want to be one of the first," Schwartz says. "I'll let it work into the environment first."

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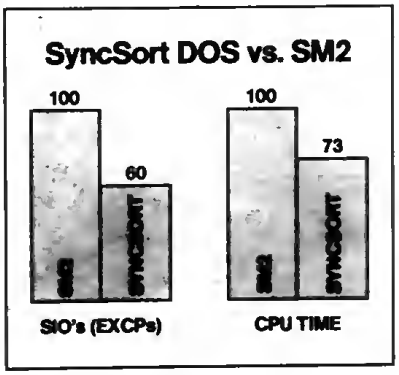
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CDC enhances, cuts price of Cyber/180 line

Says competition, lower costs prompted slashes

By James Connolly

MINNEAPOLIS — Control Data Corp., citing reduced manufacturing costs and competition from IBM and Digital Equipment Corp., last week slashed prices by up to 30% on its Cyber/180 line and enhanced that family of superminicomputers and mainframes.

CDC introduced nine enhanced models of the 2-year-old Cyber/180 product line. The three low-end models feature lower prices and double the memory capacity of their predecessors. The four mid-range models offer the same memory as before but have lower prices and a new I/O subsystem. The new high-end Model 990E and 995E dual processors feature lower prices as well as quadrupled memory.

"We have been on a learning curve, and we have had a goal of continuing reductions in the manufacturing costs of this family of computers. So it is a balancing of a reduction of manufacturing costs and a reducing of pricing to stay competitive and still trying to maintain your margin," said Jim Murdakes, CDC vice-president of sales and marketing for computer systems and services.

Some of the sharpest price cuts and memory boosts were in the high-end models. Where a Model 990 previously had a maximum memory of 32M bytes, the 990E and 995E now offer up to 128M bytes of memory. A 990 used to cost $3.35 million for an 8M-byte system, while a 16M-byte 990E now costs $2.35 million. CDC also announced a high-speed I/O option for both models.

The new low-end models are the 810A, 830A and 830A Dual CPU supermicrocomputers. The 810A costs $121,000 with 8M bytes of memory, compared with $125,000 for a 2M-byte 810. The 830A with 16M bytes costs $175,000, $5,000 less than a 2M-byte 830. The 830A Dual CPU with 16M bytes costs $252,000, rather than the $290,000 that the 830 Dual CPU cost with 2M bytes of memory. Memory for all three low-end systems was doubled from 32M bytes to 64M bytes.

Prices for the mid-range 840A, 850A, 860A and 870A units range 18% to 25% below their predecessors. A typical 840A with 16M bytes costs $580,000, and a typical 870A with 16M bytes costs $1.98 million.

While memory remains the same in the mid-range systems, the new models feature a field-installable I/O subsystem that was designed to double the ability to transfer data from main memory to peripherals. The subsystem costs $290,000.

Net manager offers quality voice packeting

Stratacom jumps into field while AT&T stalls

By Stanley Gibson

NEW YORK — Applying packet switching to voice transmissions, Stratacom, Inc. last week introduced a T1 network management system. Its Integrated Network Exchange (IPX) is apparently the first commercial product to offer high-quality voice packetization technology.

Richard Moley, Stratacom president, said the advantages of the system are a four-to-one improvement in bandwidth efficiency, greater reliability and more flexibility in configuring a network. The Cupertino, Calif.-based company plans to sell the product to companies that manage their own T1 networks.

Packet switching, introduced in the 1970s for data transmission, has not been successfully applied to voice transmission before, owing to the different natures of voice and data. According to Moley, traditional packet switching systems typically transmit approximately 1,000 packets per second over a T1 line, a rate that is acceptable for data but not for voice. The Stratacom system transmits 160,000 packets per second over a T1 link, resulting in high-quality speech, he said.

Another barrier

The other barrier to packetized voice is the fact that, unlike data, voice packets that arrive out of sequence cannot be retransmitted, since voice exchanges occur in real time. Stratacom circumvented this problem with an algorithm that drops all packets that arrive out of sequence, rather than trying to retransmit them. The company claims this procedure results in no perceivable degradation of transmission quality.

Voice packetizing is "a technological breakthrough because instead of having to allocate separate channels for voice and data, you can combine the two in the same channel, permitting far more efficient utilization of bandwidth," said Joaquin Gonzalez, senior analyst at the Gartner Group of Stamford, Conn.

Stratacom's product is "extremely sophisticated from a technical point of view" but may never get off the ground because AT&T Bell Laboratories is working on a similar technology that is likely to be the industry standard, Gonzalez added. "Companies are likely to hold off buying from a small company and instead wait for the standard that the gorillas of the industry will use."

Following a technological path parallel to Stratacom's, AT&T Bell Laboratories said it recently completed a field test of its own voice packetization system in the San Francisco area.

Bell Labs said its voice packets travel at one million pulse code modulations per second and achieve a fivefold improvement in bandwidth efficiency. However, a Bell Labs spokesman said AT&T has "no immediate plans to implement it."

Both systems achieve voice compression by interleaving different voice conversations over the same channel, thus making use of the silences inherent in normal speech.

Stratacom said it uses adaptive differential pulse code modulation to gain another two-to-one improvement in performance, resulting in a four-to-one improvement over conventional speech transmission. In this way, it is possible to send 96 voice circuits over a normally 24-channel T1 carrier.

Stratacom said its IPX has been tested by and is compatible with AT&T and Rolm Corp. equipment. The IPX offers a D4 format that supports channel banks, multiplexers compatible with AT&T's Digital Access Cross Connect Switch and value-added T1 transmission carriers. IPX was also designed for Integrated Services Digital Networks integration, Stratacom said.

Stratacom is now setting up a direct sales force and is "looking at OEM and strategic alliances," Moley said.

Prices for an IPX system range from about $50,000 to more than $1 million, depending on the number of T1 lines and nodes in the network.

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Software innovators creating better ways to manage business

Crowds jam PC Expo show

Show succeeds despite lines, confusing layout

NEW YORK — Despite few major product announcements and some minor glitches such as long, slow registration lines, the PC Expo show, held last week, was a success, according to exhibitors and attendees.

Unlike other trade shows, such as Comdex and the National Computer Conference, PC Expo attempts to limit registration to corporate buyers.

Other PC Expo coverage. Page 8

Ralph Ianuzzi Sr., the show director, said the show attracted approximately 30,000 attendees.

Product announcements, although large in number, were not the show's strong suit, according to attendees.

Personal Computer AT compatibles

Among the more than 25 firms announcing products at the show, Wyse Technology, Inc. introduced a line of IBM Personal Computer AT compatibles priced from $2,499.

Core International, Inc. announced a 1000M-byte internal hard disk drive for the IBM PC AT, along with the Atomizer, an IBM AT-compatible that Core will sell with a choice of two 260M-byte hard disk drives or its 1000M-byte unit.

Lotus Development Corp. made the biggest splash when it unveiled The Application Connection (see story, page 1), a line of products that allow PCs to extract data from a variety of mainframe applications.

Other announcements focused mainly on communications and included new modems, enhanced networks and terminal emulation.

While most attendees were pleased with the show, some were critical of the show's lack of organization. "It is terrible to go see an exposition where people are trying to sell you things and have to wait in line for an hour. You don't wait that long at Disneyland," said Ben Lichtenstein, president of Alexander Ross Associates Inc., a New York-based search firm. Another key criticism was the confusing show floor layout, which made booth location difficult for some attendees.

Other showgoers were disappointed by the lack of new products. "There is a lot of a faddishness. I see a lot of people trying to sell the same types of things. But it is upbeat," said Charles Rosenbaum, training specialist for the New York City Department of Social Services.

— Douglas Barney

Kapor resigns as Lotus chair; turns legacy over to Manzi

By David Bright

CAMBRIDGE, Mass. — Moving on to an "intentionally unstructured period," Lotus Development Corp. founder Mitchell Kapor resigned as chairman last week.

Kapor will remain on the board of directors and serve as a consultant to the company while formulating personal plans that do not involve Lotus. Jim Manzi was named chairman of the $225.5 million software giant and will remain president and chief executive officer as well.



Mitchell Kapor

Lotus' primary product — the Lotus 1-2-3 integrated spreadsheet package — was a major factor in making the personal computer an important business tool and has spawned hundreds of imitations. Founded in 1982, Lotus now employs some 1,200 people and boasts approximately two million customers. Lotus has lately been on an acquisition binge, acquiring all or parts of five firms in the last 18 months.

Despite all that activity, Kapor told *Computerworld* last week that he needs some breathing room in order to do his best at this point in time. He is unsure what his next venture might be.

"It is my actual intent to go into an intentionally unstructured period, because I have done well in the past when I did that." Since that was the type of period he was in when he created Lotus, "it might lead to something like that," he added. However, his next challenge, as yet undetermined, could be outside the computer industry. "Before Lotus, I was a mental health worker, I was a disc jockey, I was a meditation teacher," he said.

"It's not impossible that the next thing could be as different from Lotus as Lotus was to those things. What excites me at this point is the opportunity to go on a great adventure that's personally meaningful. To do that, you have to be willing to explore things."

Kapor said he will complete the software project he has been working on with research and development vice-president Ed Belove and other staff members. That project involves a product that is neither a spreadsheet nor a word processor but an aid to the organization of text and ideas, he said.

Although Lotus has entered a critical stage in its history, Kapor maintained the company will be in good shape without his close direction. "The people running the company — Jim, the management team and the people here — are the ones with the vision and the fire and the capability to make Lotus be successful from the stage it's in now to the next stage."

While his name has been synonomous with Lotus' for nearly four years, Kapor said the post-1-2-3 legacy would belong to Manzi.

Lotus aims at micro-MIS mart

From page 1

ber, Inc.'s technology group.

Bruce Watts, an analyst with Morgan Keegan, an investment firm based in Memphis, Tenn., said he believes Lotus' pricing is fairly aggressive. "I don't think, however, that it is priced so aggressively that they won't make any money on it," Watts said.

TAC consists of three elements: PC software, mainframe software that works with specific fourth-generation languages and data bases and a central connection module for either VM or MVS.

Most of Lotus' enhancements to Ilink focus on the PC software, which was originally written in Basic and later moved over to C. Lotus added pop-end menus and roll bars similar to those in 1-2-3 and improved the speed of the PC software, said Mussie Shore, TAC product manager for Lotus.

In addition, Lotus developed optional programs for 1-2-3, Symphony and Ashton-Tate's Dbase III that allow fur the use uf TAC without exiting PC applications and use the applications' own interface when extracting data. These options will sell fur less than $100.

Lotus also streamlined the mainframe interface and increased the performance by 30% for the MVS versiun and 20% for the VM version. "The old mainframe interface had a whole bunch of questions it would ask the user. We were able to remove those questions and code the intelligence to figure it out itself," Shore said.

TAC currently includes versions to extract data from languages such as Martin Marietta Data Systems' Ramis; Information Builders, Inc.'s Focus; SAS Institute, Inc.'s SAS; IBM's SQL/DS, IC/1 and ADRS2; D&B Computing Services Co.'s Nomad2; and Business Information Systems, Inc.'s ADL/DI. Lotus claimed. This data can be translated into PC formats such as WKS, WRK, WK1, WR1, DIF, CSV, PRN and Sylk.

Lotus developed the Nomad2 and SQL/DS connections itself and said a version for IBM's DB2 will be in beta test by the end of the year. TAC works with the IBM 370; IBM 4300 processor series; 3030, 3080 and 3090 series; and compatibles.

The product announcements at last week's PC Expo show drew a mixed response from micro managers and corporate buyers. Some wundered whether Lotus has the sophistication to sell into the new market.

Others were disappointed that the Lotus offerings dn not work with more machines. "The problem is they only acknowledged that firm with three initials that is also Blue. When I asked 'Can you do the same thing in the Digital Equipment Corp. environment?,' they say no," commented Raye Schwartz, DP manager for Townley & Updike, a New York-based law firm.

Lotus officials, however, say they believe the ability to work with IBM mainframes is currently more important than working in the DEC environment.

"There is a significant critical mass on the IBM mainframe side," said Alexander D. Crosett III, information center group manager for Lotus, citing IBM's large installed base of mainframes.

Commenting on moving the product line over to the VAX, Crosett said, "It is a future-oriented thing." The main problem in moving to the DEC environment involves issues of distributed data bases on minicomputers, Crosett said. "There is nothing about the architecture that doesn't lend itself to more complex network topologies," nnted Peter Meekin, marketing director for Lotus.

Users of the earlier versions of Ilink, however, were pleased with the announcement. "Users will see results faster. It is going to be much easier to use," said Denise Smith, information center analyst for Wright Line, Inc., a Worcester, Mass.-based computer supplies manufacturer. "It will be much easier for me to use for ad hoc requests for users and to train someone who is going to use it on a regular basis."

Post-merger Burroughs eyes telecom

By Takehisa Kondoh
Computerworld News Service

TOKYO — In an effort to allay the fears of Japanese customers, Burroughs Corp. Chairman W. Michael Blumenthal pledged here Friday to keep both Burroughs' and Sperry Corp.'s existing and future hardware and software lines separate and distinct. The two companies merged six weeks ago.

The company that will arise from the merger, Blumenthal maintained, will orient itself during the next 10 years toward systems integration and telecommunications. The company will fine-tune its strategies toward regional markets, he said.

The merged company, he elaborated, will also "continue to support, develop and enhance the separate individual architectures and software developments of the two companies. There's no change in that at all," Blumenthal said.

Blumenthal met with the press during a week-long trip to Japan. During that trip, he said he conferred with representatives of "many hundreds of Sperry and Burroughs users."

Sperry Chairman Gerald G. Probst, who accompanied Blumenthal, said Sperry is "completely in accord [with Burroughs] in terms of the ways in which we plan to operate."

Sperry and Burroughs products are distributed in Japan by Nippon Univac Kaisha K.K. and Burroughs Co., respectively.

The merger, he predicted, will make the new company united and stronger, both financially and technically. Blumenthal called the merger a "historic event," representing a "very important change in the structure of the world computer industry and [creating] the second majnr force of great size and importance to the industry."

Both companies, he elaborated, had been "doing well separately, [but realized] we could do even better together."



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Big Blue cuts to dealers seen double-edged

By David Bright

BOCA RATON, Fla. — IBM early this month quietly reduced dealer prices on selected models of its Personal Computer line. The action was seen by observers as both a retaliation against the growing legions of low-priced clones and as a clearance sale to make room for a new generation of Personal Computers expected later this year.

The action became public last week and resulted in price reductions to dealers of as much as 18% on selected models of the PC line. Industry insiders fear that in addition to competing through lower prices, IBM may soon start directly pressuring retailers to stop selling copycat machines, which the firm has reportedly already attempted to do in the U.K.

While not revealing the exact amount of the reductions, a spokesman at the IBM Entry Systems Division confirmed that wholesale prices on two IBM PC models and one IBM PC AT model had taken effect for a limited period of time. "We consider this to be a routine type of promotion, the type of promotion that we offer periodically throughout the year," the spokesman said. However, he said such promotions normally occur during the fourth quarter.

Price cuts on slow-selling models

"I'm surprised it took them so long [to cut prices]," said Aaron Goldberg, vice-president of microcomputer services at International Data Corp., a Framingham, Mass.-based market research firm. Goldberg pointed out that the price reductions are only on slow-selling machines — the older IBM PC and the 6-MHz version of the PC AT, which has not been selling well since IBM introduced an upgraded 8-MHz version three months ago [CW, April 7]. Goldberg predicted that IBM will discontinue the basic PC by the end of the year.

Any significant dealer savings will be lost as the highly competitive climate forces dealers to reduce their retail prices, predicted Norm Dewitt, an analyst with Dataquest, Inc. of San Jose, Calif.

Dewitt predicted that as soon as late third-quarter '86, IBM will release a PC replacement family based on the PC Convertible architecture.

According to Patrice Johnson, president of the 200-member Association of Computer Retailers in Michigan, dealers will "absolutely" be dropping some clones. If they do not, she said, IBM may put pressure on them by withholding support and advance sales information.

The war has already been waged extensively in England, where the clones have caused IBM's sales to slip, sources said. One dealer told *PC Business World* that outlets selling Compaq Computer Corp. and Olivetti Corp. IBM compatibles were feeling the strain. "Our IBM salesman asked us to remove our Compaq promotional material and replace it with advertisements for the IBM PC," he explained. IBM spokesmen in the U.K. were unavailable for comment.

Connectivity, clones top concerns at PC Expo

Attendees are cool on IBM's Token-Ring

By Alan Alper

NEW YORK — Communications products that would serve their firms into the next decade were on the wish lists of many MIS managers attending the PC Expo trade show held in New York last week.

A number of MIS managers also said that for the first time, they were seriously looking at lower priced IBM Personal Computer clones. Others, however, said they worry about the software compatibility of the clones.

"Sharing information and connectivity are the biggest issues," noted Elizabeth Clark, technical officer at Manufactorers Hanover Trust Co. in New York.

Because of its worldwide presence, the bank is always looking for more effective means of communicating within and from outside the organization. "We're always looking at 3278 and 3279 emulation for communicating locally," Clark said. "We'd also like to develop a means for people traveling outside the organization to transmit data back to the office. We're looking at portables with tools like Borland Internstional, Inc.'s Sidekick and things like that."

Ira Ehrenfeld, senior technical advisor at Buck Consultants, a Harmon Meadow, N.J., benefits consulting firm, said mainframe-to-micro connections would be the focal point of his endeavors for some time to come.

"Everyone has been talking about the IBM Token-Ring for the last two years. They'll probably be talking about it for the next few years as well, but the key issue at our firm is the need for PCs to be able to access data from the mainframe," he said.

Buck currently has one IBM PC XT 370 that can access files from a mainframe operating under IBM's VM. That is grossly inadequate for a firm with 250 stand-alone PCs located in 20 offices nationwide, and in which several departments need to get at the same data, Ehrenfeld said.

Russell Harding and Robert Harkins of The BOC Group in New Jersey, a manufacturer of gases and welding supplies, were searching for a local-area network. "We looked at the IBM Token-Ring, but we don't think it's there yet," said Harkins, who is the firm's PC coordinator.

Harkins is troubled by the fact that one PC AT on the network has to be a dedicated file server. Other vendors' schemes also permit the PC AT handling file serving to function as a workstation, he said.

Surveying the various PC clones on the exhibit floor, many of which were priced 15% to 20% below comparable IBM products, a number of MIS managers seemed tempted to try the non-Blue micros.

"We have no apprehension about going with non-IBM micros," noted Thomas Finnessey, of Urbach Kahn & Werlin, an accounting firm in Albany, N.Y., that currently uses IBM micros exclusively. "As long as we can get service for the products, it doesn't matter who builds them."

Some firms are afraid to venture outside of Big Blue's calm, compatible waters, however. "If we had to evaluate all the other clones to make sure they are compatible, our department would have little time for anything else," noted Jerry Garson, an accountant at Mobil Corp.

Owners resist filing net info

From page 1

competitors with access to critical strategic information.

While the current proposal would only affect organizations in Utah, the Telecommunications Association (TCA), a national user organization of telecommunications managers, claims the rule could establish a precedent for other areas of the country.

"Every time people start talking about this rule, you see the hair on the backs of their necks rise," says Stephen Merrill, telecommunications administrator at the University of Utah. Private network owners "do not like the government prying into their affairs," he adds.

The Utah Telecommunications Managers Association, a state users group, is "united around this particular issue. We're against it," Merrill says. "I'm taking the stance that the university is exempt from the reporting requirement because it is a public institution and, therefore, has no private network, even though we use private lines."

Gary Robinson, a technical engineer at a Salt Lake City broadcasting company, Bonneville International Corp., says his company opposes the rule and will claim exemption on the grounds that commercial broadcasting ventures fall under the jurisdiction of the Federal Communications Commission.

"We are claiming exemption not only for our broadcast facilities but also for private network operations such as our satellite and microwave links," Robinson says. "Even though some of those links could be considered bypass, they all relate to our primary business, which is FCC licensed." Both Merrill and Robinson concede the commission could disagree with their interpretations.

Utah Public Service Commission staff director Doug Kirk says the intent behind the rule is for the commission to monitor, not control, private networks that bypass local operating company facilities. "Just over a year ago, the state legislature passed a law allowing us to do this."

Kirk adds that the rule "is likely to be altered in response to the comments that have been submitted."

In its current form, the rule would require organizations to send a notice to the commission on existing private network installations and report on additions and changes within 30 days after implementation.

Each notice would contain 20 items of information, including size of network facilities, types of users, types of lines, operations costs, reasons for installation and identification of "facilities and/or services previously provided by a local carrier that were eliminated or reduced as a result of the system's construction or expansion," the ruling states.

TCA takes issue with ruling

In the filing, the Utah Public Service Commission says that "compliance costs for affected corporations and persons will be minimal." In comments it filed with the commission, the national TCA disagreed, taking issue with the reporting requirement in three areas.

First, the rule "will impede or discourage the development of private telecommunications systems" by imposing "a heavy compliance burden in terms of cost and resources needed to prepare and file the reports," the TCA says. "It could take considerable effort to answer all 20 questions; not all companies have kept complete records of their installations," says Michael Woody, the TCA's vice-president of regulatory affairs.

The rules also would require that network owners make a report every time they add a new customer or expand their networks.

The user organization's second objection is that the public reporting of proprietary information would have an anticompetitive effect on the owners and operators of private lines. "Once the information is on file with the commission, anyone can look at it," Woody says. "A telecommunications manager of a competing company can find out what my network capacity is, where it goes and whom it serves. That's serious."

The TCA also believes the requirement is "inconsistent with federal statutes and policies and is preempted by order of the Federal Communications Commission."

Michael Senkowski, a partner at Riley & Rein, the law firm that acts as the TCA's general counsel, helped draft and submit the comments. The Utah Public Service Commission claims that the purpose of the proposal is to help it enforce FCC regulation Part 94, Senkowski says. Part 94 allows, but also restricts, the resale of excess capacity on private fiber-optic and microwave networks.

"The FCC has stated that Part 94 preempts state involvement in this area," Senkowski says. "We plan to get the FCC involved if the Utah Commission looks serious about passing the rule," he says.

The TCA suspects divested Bell operating company Mountain Bell is a prime mover behind the proposal, Woody says. "I don't *know* that Mountain Bell is behind this, but it's very suspicious that the rule requires private network owners to identify 'any facilities and/or services previously provided by a local exchange carrier.' This tells them how much revenue they are losing as a result of private network installations."

Mountain Bell has taken a neutral position in regard to the proposed rule, according to spokeswoman Carol Dunlap. "We are not behind the rule. We are taking no action for or against its adoption," she says.

Mountain Bell, she adds, is "procompetition and pro-deregulation. Private network technology is already here, and we don't see how it can be effectively policed, even if the rule goes into effect."

GEISCO scraps plans for automated clearinghouse service

Federal Reserve retains near-monopoly in mart

By Mitch Betts

General Electric Information Services Co. (GEISCO) last week announced that it is scrapping its plans to create a nationwide automated clearinghouse service for banks, partly because of what it called unfair competition from the Federal Reserve System.

GEISCO, based in Rockville, Md., claimed it had spent more than $10 million to position itself to enter the automated clearinghouse business, a service that clears electronic payments for banks. The attempt was part of a new GEISCO strategy to use its global teleprocessing network to handle electronic payments and document exchanges in vertical markets [CW, May 5].

The GEISCO decision was a disappointment for supporters of private-sector competition to the Federal Reserve, which has a near-monopoly on bank automated clearinghouse operations. William R. Moroney, president of the National Automated Clearing House Association (NACHA), said banks support competition in hopes of getting lower fees, better service and "innovative stimulation in the marketplace."

Other companies that have expressed interest in starting an automated clearinghouse business are AT&T Communications, Automatic Data Processing, Inc., J. C. Penney System Services, Mastercard International and Visa USA, Moroney said. GEISCO operates a regional automated clearinghouse in California, a move that was considered a stepping stone to a national operation.

David A. Shepherd, manager of GEISCO's payment services operation, said the decision against launching a nationwide automated clearinghouse was based on the slower-than-expected growth in the volume of the business and policies of the Federal Reserve Board.

"The overriding issue, simply stated, is that the Fed, in its dual role as regulator and service provider, has established and maintains a framework for providing automated clearinghouse services which enables its 28 automated clearinghouse processing centers to enjoy preferential treatment over any private-sector providers," Shepherd said.

Specifically, he complained that the Fed's access deadlines, fees and settlement conditions are not equitable or compatible with a private-sector clearinghouse business.

A Federal Reserve Board official could not be reached for comment, but the Fed reportedly has denied that it has an unfair advantage over private automated clearinghouse operations. In March, the reserve board made several rule changes intended to create a more favorable climate for private-sector competitors.

NACHA President Moroney said the Fed's rule changes in March were a step in the right direction but that more reforms were needed to encourage private-sector automated clearinghouse businesses.

GEISCO's Shepherd said that in the future, if the Fed makes policy changes favorable to private-sector automated clearinghouse processors, GEISCO may change its decision.

An automated clearinghouse in the banking industry processes certain types of electronic funds transfers, such as direct-deposit payroll and Social Security payments, utility payments, insurance premiums and other preauthorized payments.

TOP OF THE NEWS

NEWS from page 1

AT&T officials told Daniel Rosenbaum, editor of "Wiretap" newsletter and a *Computerworld* columnist. AT&T developers reportedly could not achieve the right combination of screen readability, low cost and portability. The company would have persevered with its marketing plans for the laptop if it had landed the Internal Revenue Service laptop contract [CW, March 3] or if demand for laptops seemed to be increasing. AT&T would not comment.

■

Intel Corp. announced Friday a second-quarter loss of $20.3 million, or 17 cents per share, on revenue that declined 15% from year-earlier levels to $305.2 million. The figure included an extraordinary revenue gain of $2.5 million. In the year-earlier quarter, Intel earned $9.2 million, or 8 cents per share, on revenue of $350 million; Chairman and CEO Gordon Moore said it will "continue to be difficult to make progress" because of excess semiconductor industry capacity and soft computer demand.

■

Parallel Computers, Inc. of Santa Cruz, Calif., will introduce three machines in its series of on-line, transaction processing systems today. The new supermicro and minicomputer products are said to be hardware fault tolerant, with each critical component having a twin. Prices will range from $21,000 to $100,000 for the 200XR, 400XR and 500XR models.

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2. Examples To make it easier for you to master the complexities of CICS, these books are chock-full of examples...from syntax summaries for CICS commands to schematic illustrations that show how various CICS elements work. But more important, these books give you complete design and code for 16 CICS programs (5 in *Part 1* and 11 in *Part 2*).

Examples like these will help you in 2 ways. First, when you're reading the texts, they'll help you understand the CICS elements you're learning about. Second—and this relates to what I said about design—you'll be able to use the examples as models when you're writing your own programs. So you'll be able to show what a topnotch CICS programmer you are from the very first program you write.

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Elxsi says CPU, chip revamps will double 6400's power

Processor compatibility key to memory boost

By James Connolly

SAN JOSE, Calif. — Promising its customers twice the previously available power, Elxsi plans to introduce today a central processor and denser memory chips for its System 6400 parallel multiprocessor.

The company said it will announce its M6420 CPU for field upgrades of its older M6410-based systems and for new System 6400s. Elxsi, a subsidiary of Trilogy Ltd., claims to have more than 70 of its systems, with configurations ranging from one to 12 CPUs, installed in the aerospace industry, electronics firms, government laboratories, universities and the Unix marketplace. The company targets scientific and engineering markets as well as limited business applications.

Elxsi also plans to announce a quadrupling of the physical memory capacity of the System 6400 to 768M bytes and an increase in cache memory from 16K to 64K bytes. Trilogy President Gene M. Amdahl said last week that Elxsi also plans to use 1M-bit memory chips to increase physical memory to 2G bytes next year.

Elxsi President Peter Appletnn-Jones said a key element of the announcement is the ability to add the new processors to Elxsi's existing 320M byte/sec. system bus. "To our knowledge, this is the first time two processors using different designs have worked together on the same system bus with no hardware or software modification," Appleton-Jones said.

Appleton-Jones added that the M6420 has shown performance gains ranging from 1.7 to 2.3 times the earlier M6410, with a typical application mix runnng twice as fast on the new processor. He said the old and new processors, each consisting of a three-board set, can run on the same system with the M6410. Appleton-Jones rated the single-CPU performance of the M6420 at 10 million instructions per second.

The performance gains, according to Appleton-Jones, come from streamlining and increasing the performance of the instruction unit on instructions such as loads, stores and branches; increasing the cache size; improving the computerized instructinn speeds in the execution unit; and software and firmware improvements.

He also claimed that the System 6400 provides a performance range that bridges the gap between the Digital Equipment Corp. VAX 8650 superminicomputer, which Elxsi claims the System 6400 outperforms by 10% to 50%, and the Cray Research, Inc. Cray-1 supercomputer, which Elxsi claims is comparable to a fully configured 12-CPU System 6400.

The cost to upgrade an M6410-based System 6400 to an M6420-based system is $140,000. A two-CPU system with 32M bytes of memory costs $475,000 with the M6410 and $625,000 with the M6420.

One Elxsi user who learned of the announcement last week said his company probably will mnve up to the faster processor and denser memory. "We are going to have a 6420 fitted. We have just about used up the capabilities of our machine now, and we are looking forward to seeing whether it does give us the double performance," said Jeff Robinson, director of engineering for General Datacomm, Inc. of Middlebury, Conn. The company uses a six-CPU Elxsi system for circuit designs.

Elxsi system 100 times faster

Robinson said the Elxsi system is 100 times faster than General Datacomm's earlier DEC VAX-11/785 for most applications and that the additional memory will provide users with more flexibility. "I don't see us buying any more cabinets or any more computers, although I do expect to add memory and swap CPUs in the cabinets that we have now," he added.

Robinson acknowledged that he had considered it a gamble to buy an Elxsi system two years ago because of the shortage of software for the machine. However, he said the ability to run Unix, as well as Elxsi's EMBOS, allows access to a greater software library.

Trilogy's Amdahl previously said that his firm's merger with Elxsi was, in part, intended to provide the means to use technology developed by Trilogy. He reported that little Trilogy technology is used in the current System 6400, one reason being the recent agreement to sell Trilogy's packaging technology to DEC for $10 million.

"That technology won't show up in our products for two or three years. The reason it will not show up is that at the time we sold it to DEC, we agreed to give them a two-year head start. Even if we had decided to use it ourselves — and we still retain the right to — it would have taken two years to implement it, so the most we would have gained is a year. Also, at this level of performance, there would have been a marginal gain in performance," Amdahl said.

Appleton-Jones noted that the greatest benefit to Elxsi from the Trilogy merger has been the cash infusion that Trilogy provided.

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Cobol standard add-ons flayed

From page 1

During the next 30 days, members of the X3J4 committee, who represent major compiler vendors and users in the U.S. armed services and the private sector, will cast their ballots on the question of adding "intrinsic functions" to Cobol. These would provide Cobol with mathematical functions now associated with the Fortran language, such as the ability to calculate square roots and perform trigonometric calculations. Cobol currently possesses limited mathematical capabilities.

ANSI panel members agree that proposed features would improve the language. But several committee members fear the addendum process itself will pollute the standards process, resulting in a stream of approved additions that will confuse vendors and users alike.

Because the proposed additions were omitted from Cobol 85, the addenda — if approved in the upcoming balloting — will be optional for compiler writers. According to X3J4 committee members, writers can choose on their own whether to add the mathematical functions to the standard Cobol 85 language.

"The spirit of the addendum process was to allow you to add new features without going through a 10- to 15-year cycle. But the implementation has not been clearly thought out," says Lawrence K. Madison, committee member and data processing director at Travelers Insurance Co. in Hartford, Conn.

"I've been opposed to addenda," says Lemuel Skidmore, principal of Skidmore Resource Management in Clinton, Conn., and vice-chairman of the ANSI committee. Adding features on a spot basis strays from the committee's charter to make Cobol a more uniform language, he says. Each feature may be desirable on its own, but as compiler writers contemplate a growing list of optional addenda, "the implementation will be horrendous," he predicts.

The optional nature of the addenda is troubling even to advocates of the addendum process. If the committee detects an error in Cobol 85 and adopts an addendum to correct it, the question is whether that correction should be optional, says Bruce Gaader, a member of the committee and director of computer services at Macalester College in St. Paul, Minn. He is the representative of the Digital Equipment Computer Users Society on the committee.

Committee member Jerome B. Garfunkel of Garfunkel Associates in Litchfield, Conn., thinks the first step of the addendum process does not go far enough.

"The original addendum was much fuller. It's been chipped away by people who want to see this addendum process go away," he claims.

With both advocates and doubters on the committee, the fate of the initial addendum appears to lie with the vendor representatives, who occupy 14 of 21 seats. Some of them may be inclined to vote against the addendum, Madison says. If addenda were added regularly, vendors would be under pressure to constantly revise their compilers, he adds.

Skidmore, another user representative on the committee, says the issue of how often the addendum process will be used is a valid concern. "What had been a stable standard will start changing every few months," he charges.

The debate over addenda occurs at a time when many Cobol users are still trying to decipher how they will be affected by the changes incorporated into Cobol 85. Part of the reason is that few compiler vendors have yet to produce Cobol 85 products. They have until Oct. 1, 1987, to get Cobol 85 compilers validated by the General Services Administration, Garfunkel says.

As committee members explain it, the addendum process is an outgrowth of the Cobol 85 revision process. The goal of the Cobol 85 drafters was to reduce its ambiguities, add function and allow it to make use of modern, structured programming concepts, committee members agree.

The revision process was cut off in June 1978 to reach decisions on what was presumed at the time to be Cobol 80, later referred to as Cobol 8X, as a storm of negative comment dragged out the public review process.

Much of that comment was directed at features being added to Cobol that increased its portability but also increased its incompatibility with earlier versions of the language, committee members relate.

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Xidex 3480-type cartridge to debut

By Donna Raimondi

SANTA CLARA, Calif. — Xidex Corp. this week is scheduled to announce tape cartridges for use in IBM's popular 3480-type subsystems.

The Xidex 34800 tapes, manufactured in Omaha at the site of the former Control Data Corp. Business Products Division that was acquired by Xidex in December 1985, will be in full production by August, the company said.

CDC and Xidex both had 3480-type tape products in the works when CDC was acquired, according to Bert Zaccaria, executive vice-president of Xidex.

"CDC was further ahead of us in development, and that is why we can start selling this in June," Zaccaria explained.

No tape drive system will be forthcoming, he added, as the company supplies storage media, not hardware.

The product will retail for a single-quantity price of $20 per tape.

Diet firm says Datagraphix blocking used COM sales

Files suit alleging federal antitrust law violations

By Jeffry Beeler

SAN FRANCISCO — A firm's inability to sell a used computer output microfiche (COM) system has prompted that company to sue the equipment's manufacturer for allegedly violating federal antitrust and racketeering laws.

In a complaint filed in U.S. District Court last month, Cambridge Plan International, Inc. (CPI) accused Datagraphix, Inc. of engaging in pricing practices that have effectively stifled competition in the aftermarket for its own used products.

The complaint, filed in San Francisco, also alleges breach of implied covenant and written contract by Datagraphix, the U.S.' largest COM hardware supplier and a subsidiary of General Dynamics Corp., a giant defense contractor.

Through its attorneys in both San Francisco and San Diego, where its headquarters is located, Datagraphix last week declined to comment on the suit except to deny CPI's allegations and promise a legal reply at an undisclosed date.

CPI asked the court for $65,000 in damages, which would automatically be trebled under federal antitrust and racketeering laws. The Pacific Grove, Calif.-based firm may also be entitled to punitive damages, the exact amount of which would have to be set by a jury.

Scuttled attempts

CPI's breach-of-contract claims stem from allegations that Datagraphix deliberately scuttled the plaintiff's attempts to resell its used COM system to another user on the open market.

CPI, originator of the once-popular Cambridge Diet plan, said in its suit that it had tentatively persuaded a neighboring user, the Santa Cruz County government, to buy the hardware for $65,000. But the county later balked at the deal when Datagraphix demanded $43,285 to transfer the machine's maintenance agreement to the prospective new owner, according to the complaint.

The fee, which the vendor purportedly required for the system's refurbishment, struck CPI as excessive for a damage-free unit that had seen less than 200 hours of use, the complaint said.

Datagraphix's actions in the CPI case form part of a nationwide pattern of activity calculated to monopolize the firm's share of the used COM equipment market, the court document alleged.

To support its contention, CPI cited two instances in which other user organizations reported similar problems in unloading their used COM systems because of Datagraphix's steep refurbishment charges. One of the companies is National Business Systems, Inc., a Minneapolis-based COM service bureau.

"We have a couple of pieces of used Datagraphix equipment sitting in our warehouse right now," said Joe Tafs, general manager of National Business System's COM division. "We really haven't even tried to sell the machines because we've learned the hard way that Datagraphix would charge the buyers $30,000, $40,000 or $50,000 to transfer the maintenance agreements."

For the money it would have to spend to buy an old COM system and transfer the all-important maintenance agreement, a user organization could probably acquire a late-model unit fresh from the factory.

So in part, the intent behind Datagraphix's pricing policies is apparently "to entice companies to buy new equipment rather than used," Tafs said.

"If CPI's experiences are typical, Datagraphix has managed to insulate itself from competition in the secondary market and can dictate almost any price or availability terms it wishes," according to the plaintiff's attorney, James Gilliland.

At the heart of CPI's complaint is a Datagraphix Model 2280 COM system that the user bought for $154,000 in November 1982. But after September 1983, when business soured and CPI declared bankruptcy, the company decided to liquidate many of its assets, including the COM equipment, to pay off its creditors, Gilliland said.

In spring 1985, when CPI finally found a prospective buyer for its system, two Datagraphix technicians were dispatched at Santa Cruz County's request to inspect the merchandise, which by then was lying in storage.

Although the inspection took less than a day, it cost $2,500, which "is grossly in excess of the $200 to $500 charge for certification inspections of computer equipment," the complaint said.

After a delay of several weeks, Datagraphix initially sought $98,000 to transfer the equipment's maintenance agreement to the county and then lowered the figure to $43,285 when the potential buyer protested.

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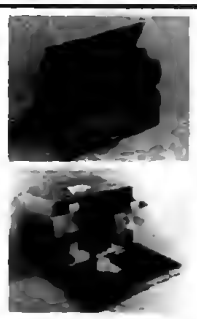


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Micro execs' role changing

From page 1

much more expendable, many observers say.

Some managers predict that if an economic downturn prompts businesses to cut expenses, the micro manager's job will be among the first cut, because the major tasks have already been accomplished.

Therefore, many microcomputer managers and consultants agree that it is time for managers to expand their horizons.

Some former micro managers who have become consultants now strongly urge other managers to acquire those crucial business skills One such consultant is Randy Casto, president of the Casto Group, Inc., based in Overland Park, Kan.

"The information center manager today must have business acumen to understand not only what the technology can do but also how it directly relates and contributes to the company," Casto says. He stresses that this is true whether the manager is involved with microcomputer and mainframe computing or just PCs.

Typically, in the "novelty period" — the first 12 months of an information center's existence — the manager has "pretty much an easy time," Casto says.

But in the following "corporate contribution period," the manager is required to show that his center is indeed an asset to the company's overall direction.

So that managers will be prepared for this second stage and the final "maturation" stage, Casto urges them to understand their companies' business goals early on.

Wholeheartedly agreeing is Hilarius Fuchs, information center director at Continental Grain Co. of New York. Fuchs holds a doctorate in agricultural economics, and his second-in-command lends financial expertise gained from working in the controller's department.

"Our emphasis here is to move away from rebuilding the same old financial, payroll and human resource systems again and again to make them faster, nicer and smoother," Fuchs says. "They don't do very much for the bottom line. What we're emphasizing is those projects that impact the bottom line. The questions are, How can we make more money? How can we save money for the company?"

Consequently, Fuchs and his staff must be concerned not only with computers but also with such corporate essentials as cost structures, the ability to move products around quickly and the ability to obtain products to fulfill contracts.

> ***'The information center manager must have business acumen to understand not only what the technology can do but also how it directly relates and contributes to the company.'***
>
> — Randy Casto
> Casto Group, Inc.

This business awareness is particularly important in the time-sensitive grain business, Fuchs says. "In a lot of businesses, if you're a little bit late getting the information to the people, they'll say, 'Okay, fine. We can still use it.' But in the grain business, if a merchandiser making a deal doesn't have the information available to him to make a bid on a contract, and he doesn't feel comfortable making that bid, that contract doesn't come back again. You've lost the business."

Coca-Cola's micros

Such is the case at Coca-Cola USA in Atlanta, where a staff of 10 administers some 500 microcomputers. "We want to make the company more effective, not just more efficient," says John Grimsley, manager of end-user computing.

Toward that goal, everyone on Grimsley's staff has a business specialty, such as bottling, fountain service and finance. Because the staff members spend most of their time in the specific user departments, they sometimes move on to become members of those departments.

Although Grimsley has a systems analysis background on the fountain service side of the business, he intends to stick with microcomputers. He says he feels that as personal computing continues to evolve, microcomputers should play an even bigger role in Coca-Cola's strategic direction.

"It's just fun to ride that trend to its natural conclusion," he adds.

But while Grimsley and many of his peers are convinced that they need to take an active role in their companies' businesses, some managers maintain that the microcomputers alone will keep them busy indefinitely.

One senior office systems supervisor at a financial services company says that in the future, she should have her hands full keeping track of new product developments, a growing number of microcomputers within her company and a deluge of training requests.

"Once people get trained, they want advanced courses," she says. "They want more. If they're in Lotus' 1-2-3, then they want a data base course. Also, there's a constant influx of new people who need to be trained. Our waiting list for training is never less than 30 or 40 people."

She adds that users' steadily decreasing reliance on programming staffs translates to more work for microcomputer groups like hers.

Business techniques

Along the same lines, some microcomputer managers say that in particular businesses such as brokerage, the rule is to learn general business techniques rather than specifics.

This is because mainframes usually handle the specific business functions, while microcomputers are used in back-office jobs such as accounting, says Bob Duste, information center manager at Charles Schwab and Co. of San Francisco.

"I don't think it matters too much whether we're in the financial business or the banking business or the airline business," Duste says. He stresses that accounting, finance and cash control departments perform similar business functions regardless of the industry.

However, if a microcomputer manager should have a need to become more involved in his company's particular business, he should not panic, some managers say. "I think it's easier to get the business skills than it is to get the technical skills," observes Donna Dufner, information center manager at Manufacturers Hanover Trust Co. of New York.

"If a person has a technical aptitude and training and is bright," Dufner says, "we can usually teach him the business skills, because they are analytical skills, only with a different perspective. But to take somebody with a business background or sociology or psychology and try to teach them the conceptual data processing is very complicated."

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WORLD DIGEST

Computerworld News Service

MUNICH, West Germany — Karl Heinz Beckurts, vice-president of the Research and Technology Department at Siemens AG, was killed last Wednesday morning by a bomb blast on his way to work in Munich. Red Army faction terrorists claimed responsibility for the bombing. Beckurts, 56, had been director of the Institute for Applied Nuclear Physics and president of a nuclear power research institute before joining Siemens in 1980.

AMSTERDAM — TPM Europe acquired Business Solutions International from Control Data Corp. as a first step toward creating a European network of third-party maintenance companies. The firm supports hardware from most vendors but specializes in Digital Equipment Corp. and IBM environments, according to Managing Director John Stancioff.

New offices will be announced in London in September, in Paris in October, in West Germany in January 1987 and in other European countries later, he added.

TOKYO — After waiting for a year and a half, Fujitsu Ltd. now plans to begin construction of a semicustom chip plant in Gresham, Ore., within the year. The facility will reportedly be operational by mid-1987 and will produce gate arrays and standard-cell integrated circuits.

Fujitsu reportedly will initially invest between $18.7 million and $25 million in the plant, which is Fujitsu's second U.S. manufacturing facility.

BEIJING — The People's Bank of China has purchased two Burroughs Corp. A 3 mainframes and supporting peripherals for a branch office and a provincial headquarters. The deal is valued at $1 million. Other sales may also be in the offing for mainframe vendors; the bank is considering installations for branches in 14 cities. Hitachi Ltd., which already has several installations at the bank's headquarters in Beijing, may be the leading contender for those contracts.

TOKYO — Hitachi Ltd. has acquired the manufacturing and sales rights in Japan for Cupertino, Calif.-based Fairchild Semiconductor's FACT high-speed CMOS logic devices. Hitachi is set to deliver samples beginning in late 1987. According to Hitachi, some Japan-produced FACT products will be shipped to the U.S. market. FACT currently is being produced in Japan by Nippon Fairchild K.K., a Fairchild subsidiary.

TOKYO — A group composed of Nippon Telegraph and Telephone Corp. and eight other Japanese behemoths will join forces to establish a research firm for space communications in October. Some $62.5 million will be funneled into the new venture over the next 10 years to develop vital equipment for trailblazing satellite and mobile communications technologies.

Tentatively named the Space Communications Development Co., the planned firm includes representatives from Kokusai Denshin Denwa Co., Japan Broadcasting Corp., Toyota Motor Corp., Tokyo Electric Power Co., Toshiba Corp., Mitsubishi Electric Corp., Hitachi Ltd. and Fujitsu Ltd.

ZURICH — Swiss DP managers spend 40% of their departmental budget on personnel, 25% on hardware, 10% on maintenance and 8% on external software purchases, according to a recent survey of computer use by corporations in Zurich. The survey also found that 8% of the DP budget went for external data processing.

The study said the Swiss spent from $6.5 billion to $8.6 billion on data processing in 1985. Overall market growth reached only 22% in 1985, substantially less than the 54% growth recorded in 1983.

TOKYO — Sluggish Japanese demand and a continuing decline in exports combined to cause Japanese production of telecommunications gear to decline 1.5% in April from its level one year earlier. Japanese telecommunications hardware production in April totaled $829 million. Exports of such products were down 6.9% to a total of $291 million.

LONDON — Ministers from the 18 countries involved in Europe's Eureka program agreed earlier this month on a list of 58 new research and development projects, bringing the total investment of the governments and companies involved in the joint European high-technology research effort to more than $2 billion.

Projects dealing with software, robotics, communications, expert systems, industrial automation and chip technology dominate the list of new programs approved by 40 ministers from the participating countries. The group also voted to let Iceland join Eureka.

SHANGHAI — China entered the diskette business in late June with a diskette production line at an electronics plant in Shanghai. The first production run of 200,000 floppies shipped to Hong Kong. Chinese officials claim their floppies are near equals of 3M Corp.'s standard-setting product. The Shanghai plant reportedly can make 9.6 million diskettes per year.

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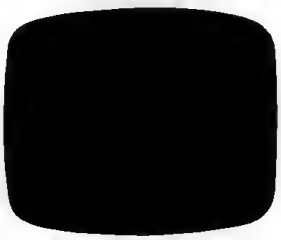
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VIEWPOINT

EDITORIAL

Keeping Cobol alive

Any language must grow, change and adapt to its evolving environment if it is to survive, and programming languages are no exception. Such change has been slow and painful for the old-timer among programming languages, Cobol. Since its birth in 1959 — spawned by a consortium of vendor and Pentagon officials seeking greater software productivity and portability — the world of commercial data processing has been totally reshaped.

Yet efforts to change Cobol have been slow and laborious: Its last major revision — Cobol 85, the successor to Cobol 68 and 74 — took *11 years* to gain approval from the American National Standards Institute and the International Standards Organization.

Why? A controversy stemming from Cobol 85's perceived incompatibilty with earlier standards for the language sidetracked the process for years. The data processing community wanted more easily maintained, more structured and more portable Cobol, but it didn't want compatibility problems. The result: a certain schizophrenia among MIS managers and the members of the standards committee.

To avoid such wrangling and to speed up revisions, standards-setters last year attempted to reform the approval process by using addendum: Essentially, Cobol will now be given new features, or addenda, every two or three years, and the language will be fully overhauled every decade. Introducing as addenda those changes likely to be included in the next full version of Cobol gives users and vendors a chance to get accustomed to them before they're adopted.

This week begins the initial test of the addenda process, as the ANSI committee responsible for changes in Cobol votes during the next 30 days whether to add certain mathematical features to Cobol.

All of this sounds good. Who wants to argue with an effort to more quickly update a language so important to the data processing community? The rub comes, as always, in the implementation. As the list of addenda grows longer, how do you prevent widespread confusion among software vendors and users, particularly since the addenda are optional?

We come down on the side of those critics, including some standards committee members, who argue that the whole addendum process causes more problems for the data processing community than it solves, that an evolving standard is no standard at all. Sooner or later, users, vendors and standards groups are going to have to decide whether they want compatibility with the earlier versions of Cobol or an upgraded language.

Given those choices, it seems clear that the data processing community must have an upgraded Cobol and a reasonable, timely revision process that guarantees it. Age is no reason for Cobol to grow feeble and die; neither is an unwieldy, ineffective revision process, one that ironically may be the biggest threat to the language it is supposed to renew.



LETTERS TO THE EDITOR

AT&T reports no such error rates

David Bendel Hertz, in his article on SDI software reliability, "SDI demands trillions of instructions, 99.9999999% reliability," [CW, June 2] cites "an AT&T report . . . that there were an average of 300 'serious errors' in every 1,000 lines of code at some 200 major corporate installations."

AT&T has produced no such report. Hertz may have obtained the data from an article that appeared in the Nov. 26, 1984, issue of *Computerworld*. Referring to a study by T. Capers Jones III of the Nolan Norton Co., the article cited those exact figures.

Our own experience is far different. We continually collect data from more than 70 AT&T projects, some involving millions of lines of source code, and we have documented an average error rate of less than one per thousand lines of source code.

In addition, with existing techniques of error checking, fault recovery and redundancy, a software system can deliver reliable performance though it may contain some errors.

Edward Fuchs
Director
AT&T Bell Laboratories Quality Assurance Center
Holmdel, N.J.

User effort prompts vendor action

The story, "Users await protocol fixes," [CW, May 19], refers to the reluctance of some companies to commit to Manufacturing Automation Protocol (MAP). The article states that many manufacturers are waiting until the factory communications standards are more complete.

This waiting game that we Americans play is dangerous and foolish. It is dangerous because by waiting, rather than acting, we are slowing down the very process that will result in complete standards. This process is called participation. Until users begin to commit themselves, vendors will not produce the products. Until vendors produce the products, the users will not commit themselves. Nobody seems willing to take the risk.

The Japanese are gaining more and more market share because they are willing to invest in the long term, often for much smaller productivity potentials than MAP has to offer. We Americans have a chance to commit to a long-term investment that will initiate a snowball of automation capabilities. If ever there existed potential for long-term profit, it does now.

The sad part is that, although there are some holes in the MAP standards, there is still a lot a manufacturer can do today to prepare for tomorrow. For example, MAP will use broadband cable; we can start installing this cable. Also, there are several vendors today that offer ready-to-use products that will allow you to receive the benefits of MAP right now.

If you cannot commit your company at this time, you can at least help in other ways. If you do not send anybody to the MAP users group meetings, do so now. And when you are there, instead of complaining about what is not complete, how about committing your time or energy by contributing ideas or by attending a subcommittee meeting? The more effort that users make in this direction, the more action we will see from vendors.

Frank K. Welch Jr.
Consultant
SEI Information Technology
Los Angeles

Don't write off Datapoint yet

I am constantly amazed at the imagination your writers and editors display in your special reports. The way you routinely manage to develop articles on minicomputer installations, local-area networks and office automation integration without mentioning Datapoint Corp. is an incredible example of seeking facts with your eyes shut and minds closed.

As a Datapoint user of 10 years' standing, I can affirm the excellence of its hardware, operating software, communications protocols and customer education and support. Its product lines have easily accommodated our successful growth in business and have met every DP need we have had. We are confident Datapoint will continue to support all of our future needs as well.

You are doing a disservice to the industry and to your readers by neglecting to include Datapoint products and customers in your research and special report presentations. Don't write Datapoint off yet — it is still an innovative leader in its marketing area.

Cynthia Casentini
Director of Data Processing
Hayward Lumber Co.
Salinas, Calif.

VIEWPOINT

Piecing together the IBM product puzzle



By AMY WOHL

The National Computer Conference's occasional sojourns in Las Vegas are an ideal opportunity for high tech to meet high tack. But the 1986 NCC barely met the qualifications. With only 400 exhibitors (and almost no minicomputer or personal computer software vendors of note), there wasn't very much high tech. The tech-to-tack ratio got out of hand.

But IBM came to the rescue, opening its cornucopia on Monday morning, right at the beginning of the four-day show, to announce 124 products and product enhancements.

The Big Blue Las Vegas blizzard follows IBM announcement extravaganzas, which were nearly as large, in January and April. It has occurred to us that this is an IBM plot. We can just hear them up in Armonk:

"Those consultants are really giving us a hard time, always complaining about what we haven't announced yet. We need to find something to keep them busy."

"Why not have more announcements?"

"You mean [shocked tone] give them what they're asking for?"

"No, no. I just mean announce so many things that they can't figure out what we're doing."

"Do we have enough stuff to announce?"

"Are you kidding? We always have stuff to announce. Besides, it's not so much what we announce; we just have to package it up so every announcement has lots of complicated little pieces. And then we'll mix op all the pieces and put them back together in really illogical ways. It will drive them crazy. . ."

Of course, that couldn't have really happened. But the result might be the same:

- The press is having a terrible time trying to figure out exactly what IBM has done or whether it is significant. This means that people who are very busy, very junior or very lazy will rely on statements from IBM executives as to what really happened, rather than try to study announcements that are too long and complicated to read, much less analyze and understand. They'd like the consultants to help them out, but . . .
- The consultants are spending all their time trying to figure out what IBM did, what was changed as a result and what they should tell their clients to do. This is akin to trying to figure out whether the Senate or the House version of the tax bill will pass and what to do with your real estate investments in the mean time. Of course, the consultants have almost no time at all to criticize IBM for what it hasn't announced yet; in fact, they're afraid to assume that anything hasn't been announced — maybe it's buried in all that paper.
- The customers aren't sure of what is going on. On one hand, their favorite vendor is doing a lot of something, which means more choices, and everybody knows that's good. On the other hand, their favorite consultants seem very busy, and they're not sure what that means.

Now, if this works just right, the consultants and the press will be so busy explaining things to each other and pondering the announcements' importance that the customers will have to buy things on their own, from the very best marketing organization in the world. Guess what — they'll probably buy something for the sweet relief of having it over and done with!

Setting a precedent

Then we'll have set a precedent All the other vendors will play copycat and put together their own 156-item announcements. Can you imagine the press and the consultants having an extended powwow to discuss a 300-page Spurroughs announcement? The news sections of every trade journal will blow their page budgets — and I'll need to buy five more filing cabinets.

What's a customer to do?

Keep the faith and depend on common sense. Big fat announcements aren't necessarily any more important than lots of little announcements. The right question to ask is, What really happened here and, Did anything I really care about change?

In fact, the smart customer throws those questions right back to the vendor. Let him who wants to sell you something explain what he now has to sell — and why you should purchase it.

If you like to keep score on your own, here's how:

- Divide up the announcements by product and/or subject areas. And immediately put away the ones you're not interested in.
- Look at the areas you're interested in tracking. Look for promises being fulfilled, new products you weren't expecting, things that provide platforms for activities that interest you.

If you suspect something important happened, check it out with an editor at your favorite newsletter or trade publication. The smart analysts aren't fooled at all — and they know how to read this stuff. In fact, being a fast, smart reader is a requirement for the job.

You'll want to tune into that level of insight if you need to make (or remake) decisions quickly — or if one of the announcements was in an area that directly affects your information systems strategy. Otherwise, just wait. In a summer in which the computer industry is slwly recovering from a slow year, there will be plenty of time to analyze, reanalyze and finally understand just what the Blue Giant is up to — and whether you need to do something about it.

Wohl is president of Wohl Associates in Bala-Cynwyd, Pa., and editor of "The Wohl Report on End-User Computing" newsletter.

Computer monitoring: Boon to employee and manager?

READER'S PLATFORM

By VICO E. HENRIQUES

Automatic measurement of work done on a computer can be an effective management technique. By counting, for example, the number of checks processed, the number of customer accounts corrected or the number of keystrokes entered into the computer, an automatic measuring device can help managers to set reasonable productivity goals, identify problems, price products and services and reward high-achieving employees.

Computer work measurement can also help employees meet their own and their employers' goals.

But like many new steps in workplace technology, "computer monitoring," as this measurement is termed, has become controversial. Opponents emphasize its potential for decreasing employee morale and increasing stress and are introducing bills into state legislatures to outlaw any measurement of work done on a computer.

Legitimate gripes

While computer monitoring is not substantially different from the familiar manual procedures that measure the quantity and quality of work, there are some legitimate employee gripes about the way some monitoring systems are used:

- When measurements are taken uver short periods of time, employees may be subject to undue stress. For instance, while the vast majority of employees might be able to meet a goal expressed in terms of number of keystrokes per week, few of them would be able to meet that goal comfortably if they were required to enter the hourly average of keystrokes every single hour.

Energy levels vary. Some employees may need to work faster in the morning and more slowly in the afternoon. Or some might encounter a particularly difficult task that requires more time. Thus, goals should be established that allow each employee to vary his speed.

- There is a fear that monitoring can be used for "speed-ups" where employees are required to do more work with no inerease in pay. While there has been no publicized case of a manager increasing keystroke quotas without compensation for data eotry workers, such an action certainly could occur.

Unless original production goals were well below national norms, or unless new work flow techniques made additinnal productivity possible, such speed-ups would be counterproductive and would anger employees, whose output quality would most likely plummet.

Advantages outweigh abuses

But the many advantages of monitoring productivity clearly outweigh the theoretical abuses. Many organizations use monitoring to provide incentive pay for data entry operators who produce above a minimum expected output.

Employees then regulate the speed at which they work to meet their desires for additional pay. There are other advantages: The computer is fair. It shows no favoritism. In addition, managers appreciate the fact that computer monitoring allows them to spot problems early in their origin and to react by offering additional training or individual assistance.

Nonetheless, a campaign is under way to prohibit computer monitoring. Such pressures are as senseless and as economically counterproductive as would be a campaign to prohibit quality control in the manufacturing process.

Critics of computer monitoring cite the several European countries that prohibit the gathering of individual productivity figures. But such a prohibition is yet another example of the labor and managerial rigidities that consistently undercut European prosperity.

American entrepreneurial values

Far from rekindling the oppression of the sweatshop, the modern concept of quantity control through computer monitoring has the potential for bringing some traditionally American entrepreneurial values back into today's workplace: workers have greater flexibility in determining their own production schedules; workers and supervisors can deal with each other as individuals rather than simply as "labor" and "management"; a worker is compensated beyond a respectable base wage for additional skill and effort; and promotions and rewards can be objectively determined without regard to race, religion or other bias.

In summary, computer monitoring cannot be discussed simplistically like another example of "man vs. machine." Quite the contrary.

To the extent that it accelerates the trend toward personal initiative and flexibility in the workplace, computer monitoring should be accepted as yet another technical improvement in U.S. competitiveness that can benefit U.S. employees.

Henriques is president of the Computer and Business Equipment Manufacturers Association.

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SOFTWARE & SERVICES

SOFTLINE
Gary Robins

Technical edit cause of delay

If I were a manager responsible for the development of application software, I'd pay close attention to the technical editing of the application's documentation.

I wouldn't be so concerned as to whether the resulting documentation was accurate — for the most part, final documents are accurate. I would be concerned, however, with the amount of time the technical editing process delays the project.

The familiar cry of "Documentation is late again!" may be factual, but the shrewd manager may be able to see through this statement and point to a lack of control in the technical review process.

The technical review process is a neglected area that often adds weeks to the length of a project. For the uninitiated, the technical review process can be briefly explained in four steps: a writer finishes a draft; the writer distributes copies of the draft to the programmers and project leader to be reviewed for technical accuracy; the programmers and project leader return the copies of the draft with their corrections to the writer; the writer incorporates the corrections. There are minor variations from company to company — there may be formal reviews of the corrections — but the sequence is basically the same. The purpose of the technical review, to ensure the software does what the documentation says it does, is also basically the same regard-

See **TECHNICAL** page 26

Robins is a senior product information analyst at the Burroughs Corp. in Radnor, Pa.

Computervision tools debut

Source code documentation and consultation offered

By Rosemary Hamilton

BEDFORD, Mass. — Computervision Corp. has informed customers that it will introduce conversion tools to help automate the porting of its older computer-aided design and manufacturing systems to its recently introduced 32-bit workstation.

It will also offer source code documentation along with programming consultation for writing programs on the new system.

The Bedford firm's announcement last week to its users group, User Software Coalition, comes on the heels of the massive two-year conversion project in which Computervision ported its Cadds software from proprietary minicomputers to an industry standard workstation. The system, called Caddstation, was introduced in April. It is based on Sun Microsystems, Inc. hardware and runs under University of California at Berkeley's 4.2 Unix.

Although the company hasn't "sorted through the packaging" of these offerings, it expects to release them in the fourth quarter, according to James Price, director of third-party marketing.

Computervision's as-yet-unnamed conversion tool kit is an enhanced version of the tool kit it used for its own conversion project. The tools were developed by Massachusetts Computer Associates, Inc., an Applied Data Research, Inc. subsidiary based in Wakefield, Mass. The two companies signed a letter of intent last week enabling Computervision to remarket the tools.

Price said the tool kit will range in price from $10,000 to $50,000, depending on the amount of code a user wants to translate. He said the tool kit will be offered in four packages: for conversion of 10,000 lines of code, 30,000 lines of code, 100,000 lines of code or an unlimited amount.

The documentation and consultation will allow users to write programs for the new Cadds. With the older systems, Computervision provided portions of source

See **COMPUTERVISION** page 20

SOFTWARE NOTES

Cobol compiler certified by GSA

The first Cobol compiler to be certified as meeting the standards of ANSI's **Cobol 85** has been produced by **Micro Focus, Inc.** The Palo Alto, Calif., supplier of compilers and productivity tools, said that its compiler was validated "without errors."

A few Cobol 85 compilers that are not yet validated are already on the market, including one from **Tandem Computers, Inc.**, with more entries expected. Vendors must have compilers validated by the General Services Administration by Oct. 1, 1987, in order to bid on government contracts.

See **NOTES** page 23

Cobol options aid productivity

By Eddy Goldberg

SALEM, Mass. — Language Technology, Inc. recently made available Release 4.1 of Recoder, a Cobol restructuring product with 26 new report and formatting options.

Release 4.1 is intended to boost programmer productivity by providing more flexibility and customization features. The Control Flow Report, for example, makes it possible to split unwieldy programs into more manageable units.

In addition, Recoder users may now specify the paragraph size and number of new paragraphs created in order to tailor the restructured program to their needs, said Eric Bush, chairman of Language

See **COBOL** page 26

INSIDE

Sterling Software's Dylakor Division announces a spreadsheet for mainframes/**20**

NEW THIS WEEK

- TRT offers telex interfaces for IBM, DEC minis
- Apollo Computer releases the Domain/Performance analysis kit
- For more on these and other new products, see pp. 91-102.

INSTANT ANALYSIS

"The spirit of the addendum process was to allow you to add new features to Cobol 85 without going through a 10 to 15 year cycle. But the implementation has not been clearly thought out."

— Lawrence K. Madison, DP director, Travelers Insurance Co.



Sterling unveils spreadsheet

GRANADA HILLS, Calif. — Sterling Software, Inc.'s Dylakor Division announced its first application product, a spreadsheet for mainframes.

Named Dyl-Calc, it was designed to mimic the operations of a personal computer spreadsheet but be available to many users at the same time and offer users the option of viewing several spreadsheets on the same screen.

Information from any mainframe data base can be loaded into the spreadsheets, and information from one may be edited and integrated into another, Dylakor President Carole Morton said.

The spreadsheet can also make use of mainframe security, as three-level password protection can be invoked and individual cells containing constants can be protected, allowing alteration of variables only, Morton claimed.

Dyl-Calc is available now for $6,000 to operate under DOS/CICS, OS/CICS and MVS/TSO.

In addition, Sterling announced Shrink/MVS, a data compression and encryption system able to provide 60% to 80% file compression for VSAM and non-data-base files under MVS.

The compression software was previously available for Cullinet Software, Inc. IDMS and IBM IMS, DOS and DOS/DL1 systems, Sterling spokesmen said.

Computervision turns believer after Compass helps convert software

By Rosemary Hamilton

WAKEFIELD, Mass. — When David Loveman, president of Massachusetts Computer Associates, Inc. (Compass), went to Computervision Corp. in 1984 to pitch his firm's software conversion tools, he found a willing listener.

Computervision, at that time, was still the leader in the computer-aided design and manufacturing (CAD/CAM) market and was preparing to convert its popular Cadds software — about six million lines of code — from its proprietary minicomputer platform to industry-standard hardware. The day after Loveman's pitch, Compass and Computervision were negotiating a contract.

Computervision had evaluated a number of different vendors' conversion tools but settled on the Compass line for several reasons, according to Massood Zarrabian, a Computervision vice-president who served as project leader.

In part, it liked the geographical proximity of the Wakefield, Mass., firm. But more important, Zarrabian said, was the quick rapport between representatives of the two companies. "There was a lot of comfort. We hit it off at our first meeting," he said.

In addition, Compass had a track record of handling large-scale conversions, albeit smaller than the Computervision task.

On Sept. 4, 1984, Compass signed a contract with Computervision and began developing the conversion tools. Compass is a 25-year-old company that was acquired in the late 1960s by Applied Data Research, Inc.

The bulk of the Cadds software had been written in Fortran S, a Computervision version of Fortran, and a small portion of the software had been written in a proprietary language called TPL. Compass' assignment was to develop tools that would convert Fortran S to Fortran 77 and TPL to C.

Zarrabian said that without the Compass tools, "we probably would have needed 15% to 20% more people." At various times, the project involved up to 200 people. On average, 40 to 100 people worked on the project, he said.

The heart of the conversion tools is a data base that contains "global information" on the software, including such information as relationships among data, how file names are used and what routines call other routines, Loveman said.

The data base contains instructions for the tools that actually convert the software. During the conversion, the code must be rewritten in a new language while keeping the function intact. When translating a

See COMPASS page 22

"Hey, Mr. Berland! We have your underware!"



A recent magazine article referred to Mr. Robert Berland, a Vice-President of IBM, who stressed today's need – not for software, hardware or firmware – but *underware*, to invisibly tie all functions together.

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Computervision tools debut

From page 19

code on a special license basis.

"It wasn't a clean programming shell," Price said. "We used to send source code so they could muck around with the system. Now we will be documenting the ins and outs so they can program effectively."

At this stage, the consultation service is planned as a special hot line number for programming problems and training courses, Price said.

He said Computervision may offer the conversion tool kit bundled with the programming documentation. "Switching the programs is only the first 15% to 20% of the game," he said. "Then comes hooking it up with Cadds. The documentation will provide clean entry points to relink the software routines with Cadds."

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"Cincom application tool slashes development time."
Source: Computerworld, January 19, 1981

MANTIS 1982

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Source: Tony Liberoni, Manager of Operations and Systems, PPG Industries Chemical Group

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"100% of our new on-line development is in MANTIS."
Source: Luther Perry, D.P. Director, Santa Cruz County, CA

MANTIS 1985

"MANTIS is the international on-line application development standard for General Foods."
Source: Fred Lambrou, International Director of Information Services, General Foods International

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Compass aids conversion

From page 20

particular module of code, the conversion tools refer to the data base to see what the purpose of the module is, he said.

The conversion tools are made up of three main components. The front end reads the code and converts it to an internal, symbolic form. Then the transformer makes the necessary changes to the symbolic representation. Finally, the unparcer rewrites the internal form as the new code.

The tools were used primarily to convert the more routine portions of Cadds that would have been monotonous work for a programmer.

Other portions of the code that were more complex had to be converted manually. "Things that were hardware specific, like graphics-related things, couldn't be converted automatically because they had to be re-engineered," Loveman said.

In the spring of 1985, it became clear that Computervision was losing market share to competitors IBM and Intergraph Corp. "By March 1985, the conversion project went into panic mode," Loveman said.

In March, Compass delivered tools to be alpha-tested at Computervision; it followed up with a revised tool set in June for beta testing. At that point, the "serious conversion" began, Loveman said. Computervision stayed on schedule, converting code and then sending it out to customer sites for testing in late 1985 and early this year.

In April, with the conversion process completed, the company introduced its Caddstation CAD/CAM 32-bit workstation, as it had planned.

DBMS bows, converts workstations

By Eddy Goldberg

BERKELEY, Calif. — Sybase, Inc. recently announced a software-based relational data base management system that it says will convert a general-purpose 32-bit workstation into a high-performance data base server.

Sybase will begin beta-testing the product at 10 sites next month, with general availability set for October on the Sun-3 workstation running University of California at Berkeley's Unix 4.2. The company plans to beta-test a Sybase version for the Digital Equipment Corp. VAX environment in October, with availability set for near year's end, spokesmen said.

The product consists of the Dataserver, which converts a 32-bit workstation into a data base server, and the Data Workbench, a separate front end. The Data Workbench is an icon-based user interface that consists of an extended version of SQL, a report-writer and application development tools.

TRW, Inc., an investor in Sybase, will host three beta-test sites. "It's much faster than the competing data base management systems, is extremely user friendly and is evolving into something that will meet the data security needs of government contractors," said Stan Stahl, senior software engineer for TRW's Defense Systems Group.

Robert S. Epstein, executive vice-president of Sybase, offered two examples of the product's performance on the Sun-3. In a query that asked to fetch one row out of a million-row table using SQL, response time was 50 msec. In a 10-table join with 10 million-row tables, response time was 360 msec., he said.

Prices for the Dataserver and Data Workbench vary depending on CPU size. The Dataserver for the Sun-3 and Microvax II is $18,000, and the Data Workbench is $7,500. For the VAX 11/780, the Data Server costs $40,000, and the Workbench, $15,000.

SCIENCE/SCOPE®

A U.S. spacecraft orbiting Venus made the first close-up views of Halley's Comet, giving scientists valuable insights into the comet at a time when it was on the far side of the sun and direct observations from Earth were impossible. NASA's Pioneer Venus Orbiter, built by Hughes Aircraft Company and circling Venus since 1978, conducted its investigation a month before five other spacecraft flew by the comet. The Orbiter was delicately repositioned with precise commands from Earth to observe Halley's at its closest point to the sun, a distance of about 55 million miles. The spacecraft measured changes in the comet caused by intense solar heating. It also provided an ultraviolet image of Halley's and its large surrounding hydrogen cloud. Data gathered by the Orbiter helped scientists determine the gas composition of the comet, the rate at which water vaporized, and the ratio of gas to dust in the comet.

A new-generation mapping radar has two advanced features to help it spot military targets and create maps with resolution equal to that of infrared sensors. The Advanced Synthetic Aperture Radar System (ASARS-2), designed to complement electro-optic sensors, is flown on a U.S. Air Force TR-1 reconnaissance aircraft and provides real-time radar imagery to a ground station in all weather. ASARS-2 has a "squintable" antenna, which allows it to look around obstructions to make maps and classifications of targets on a single pass. The system also has a spotlight mode, which allows the antenna to look back or forward to focus on a suspected target and glean more detail. Hughes is producing the system for the Air Force under a development and production contract.

The AMRAAM missile may become the next-generation weapon for protecting U.S. Navy surface ships against threats that have slipped through the outer defense shields. Sea AMRAAM, under study for ship self-defense, would be essentially the same as the Advanced Medium-Range Air-to-Air Missile in full-scale development by Hughes for the U.S. Air Force and Navy. However, compared with existing missiles, Sea AMRAAM would increase a ship's firepower because the missile's guidance system is much less dependent on the ship's radars. Many missiles could be fired at different targets simultaneously, and they could home in even if the targets were outside the field of the ship's radar systems. Sea AMRAAM is also faster, more maneuverable, and can fly farther than current ship self-defense systems.

Acting as a kind of design and manufacturing prompter, a new artificial intelligence network increases productivity by automatically generating instructions for assembling complex electro-optical devices. The Hughes Integrated Classification System (HICLASS™) analyzes product design information to determine the best assembly techniques. It then selects the most efficient manufacturing processes available. Operators, on demand, are able to call up appropriate graphical and text instructions in color as they interact step by step with the system. As a result, workmanship improves substantially and products are made better.

Hughes needs engineers, scientists, and programmers to forge new frontiers in aerospace radars, weapon control systems and avionics, airborne displays, aerovehicle data links, and airborne countermeasures. Current openings are for people experienced in design, development, test and manufacture for systems engineering, project/program management, design of circuits and mechanisms, and bringing these to reality through the application of advanced manufacturing techniques. Send your resume to Hughes Radar Systems Group, Engineering Employment, Dept. S3, P.O. Box 92426, Los Angeles, CA 90009. Equal opportunity employer. U.S. citizenship required.

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Notes: Sterling supports DB2

From page 19

Sterling Software, Inc. has climbed aboard the DB2 bandwagon. It has announced its **DMS/OS data atorage management system** for MVS will support IBM's relational data base management system. Support includes archive, backup and restore processing of DB2 data sets. DMS/OS currently supports IMS files, and with the DB2 announcement will also support archive/restore processing of VSAM files, Sterling officials said.

■

Applied Data Research, Inc.'s Datacom/DB DBMS will be used with **Pallm, Inc.**'s software to provide relational capabilities for mainframe applications in the insurance industry. Pallm, based in Indianapolis, uses the DBMS in connection with its **Pallmvector** and **Pallmpac** systems, used in the life and property/casualty insurance business.

■

On-Line Software International, Inc. of Ft. Lee, N.J., is the first mainframe vendor to provide site licenses for its micro-to-mainframe link, **Free-Link**. An annual fee of $3,000 for DOS/VSE users and $5,000 for MVS users entitles a site-license holder to unlimited copies of the micro piece of the link and a copy per CPU of the mainframe piece. President Jack Berdy says 700 copies of Free-Link's mainframe software have been given away as part of a promotional program since fall 1985. The firm sells the micro piece for $495 per copy to non-site license holders.

■

The popular statistical analysis package **SPSS/PC Plus** is also available on a site license basis, said John Grillos, president of **SPSS, Inc.** A university may license up to 2,000 copies of the $795 package for $2.50 each or $5,000 for a first-year fee. Business users face the stiffer fee of $6,000 for 100 copies or $60 a copy.

■

The expert system building software **Automated Reasoning Tool** is finding employment in a variety of places as interest in commercial systems grows. The **Inference Corp.** product was recently adopted by **Lotus Development Corp.** for use in its development of products that incorporate expert systems, and **Sun Microsystems, Inc.** will offer it on its 32-bit Sun-3 workstation.

■

Also in the artificial intelligence realm, **Hewlett-Packard Co.** is offering Knowledge Craft, from **Carnegie Group, Inc.**, on the HP 9000 Model 320 workstation.

■

BBN Software Products Corp. of Cambridge, Mass., is reportedly developing manufacturing and factory automation software for introduction later this year. It is the developer of the RS/1 scientific data analysis package.

■

Nomad2, the fourth-generation language and data base management system from **D&B Computing Services, Inc.**, has been adopted by **Holland Systems Corp.** for use in development of its Information Resource Management product line. For example, Holland will offer its Strategic Systems Planning to customers with Nomad2 for developing business models.

■

Bentley College in Waltham, Mass., may be at the forefront of a trend. Its continuing education center is offering a six-month program for career changes into hot line software support and microcomputer software consulting.

■

Peat, Marwick, Mitchell & Co.'s Catalyst Group has entered into a licensing agreement with **Joseph and Cogan Associates, Inc.**, a Burroughs Corp. subsidiary, to provide Burroughs users with Catalyst's **Pathvu** and **Structured Retrofit**. Pathvu measures program logic against structure programming principles, while Structured Retrofit rewrites Cobol into structure programs.

Computer Associates unwraps data security tool for MVS, MVS/XA

By Charles Babcock

NEW YORK — Computer Associates International, Inc. announced a release of a data access security package it acquired in December.

CA-Top Secret, formerly the Top Secret product from CGA Software Products Group of Holmdel, N.J., is now available in Release 4.1 for IBM's MVS and MVS/XA operating systems.

In addition to protecting data from accidental or intentional destruction, modification or disclosure, CA-Top Secret is now compatible with recent releases of IBM data base and interactive environments, including CICS 1.7 and IMS 2.1.

The release contains security enhancements in the areas of integrated storage control and IMS/VS Multiple Systems Coupling feature, company officials said.

The transaction level protection in CICS, IMS and Cullinet Software, Inc.'s IDMS is improved with increased administrative and reporting flexibility, company spokesmen said.

CA-Top Secret, first introduced in 1981, costs $25,000 for a three-year license. CA-Top Secret reportedly requires no initial program loads, exits, macro coding or modification to the operating system for installation.



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Technical edit cause of delay

From page 19

less of the environment.

Why does the process invariably cause delays? In most companies, controls or written procedures for the process are nonexistent. Compliance with nonexistent controls, as one may expect, is casual at best. For example, the writer will request the corrected drafts be returned by a fixed date so the documentation can be completed according to a fixed schedule. Programmers, however, can usually be counted on to spend their time writing code or fixing bugs, especially at the end of a project. After all, they get paid for programming, not for editing documentation. The review of the documentation usually gets put at the bottom of the programmer's priority list. Many weeks past the requested date, the writer will finally receive the corrected drafts.

When there are several reviewers of the same draft, as there usually are, the problem is compounded. Since the reviewers individually make corrections to a sentence, paragraph or page, it is inefficient for a writer to start incorporating corrections until all the corrected drafts are returned. In this way, the writer does not have to rewrite sections that have already been corrected. The writer usually must wait until the last draft is returned.

The most egregious cause for delay occurs when management has budgeted no time for the review of documentation. Even though management knew up front that there would be several hundred pages of documentation, no time was allotted for reviewing the material.

The second most flagrant cause of delay occurs when management has budgeted the time for reviewing documentation, but uses the time for programming because the project is behind schedule. Both cases prove to be false economies because the project will be delayed by the time it takes to review the documents.

Even when the technical review process is planned and executed according to schedule, there still are problems that cause delays. Many technical editors lose sight of the purpose of the technical edit, wanting to discharge themselves of the task as quickly and easily as possible. The brevity of the results can be laughable. These are my three favorite editorial comments:

- This is not correct.
- I don't think it works like this.
- This report has changed.

Ask any technical writer if these editorial comments are not commonplace in the industry. Other than being amusing, these edits needlessly cost the writer extra time. For example, examine the first comment. The writer now knows that something is incorrect and needs to research the answer. Usually, the writer has to track down the author of the comment to find out exactly why the documentation is incorrect and what the correction should be. This can be a time-consuming process, especially if there are several editors and each is equally vague. The point is, however, that this extra work can be avoided when the editors provide an explanation with their comments.

Editorial comment No. 2 is very revealing. The first interpretations are either that the editor is too lazy to test the code or the editor's code is too sloppy to provide a definitive answer. Another interpretation is that the draft was taken home to be edited (which is often the case) and the editor didn't have the opportunity to test the application. In either case, the burden of the work is shifted to the writer. The writer is going to have to take the time to find the answers that should have been provided by the technical expert in the first place.

The third comment is similar to the others. The writer has to scrounge up a copy of the new report when a copy could have been provided by the editor.

The technical review process is just one facet of a development project. Since it often comes at the end of the project, any delays it causes are felt immediately. Here are some recommendations to avoid delays:

- Establish a standard that can be used to budget time for technical edits; for example, 10 pages an hour. Realize that a six hundred page manual will take more than two days to edit properly.
- Incorporate the time needed to review documents in the project plan.
- Establish written procedures for deadline compliance to control the technical review process.

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*Data published in Computer Security Institute, 1985

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Cobol options aid productivity

From page 19

Technology.

Bush said the options enable programmers looking at a program for the first time to simplify complex expressions, making the program easier to understand. "Old programs have lots of conditionals added over the years, lots of 'ands,' 'ors' or 'nots,'" he said. One way the new options may be used is to eliminate one, some or all of the conditionals during restructuring.

The large number of parameters included in the release will allow users to tailor the restructuring operation to their needs by site, program or organization, according to Bush..

A $150,000 perpetual license option replaces the three-year term previously offered at that price.

MICROCOMPUTERS

SMALL TALK
Will Zachmann

Compatibles: Telecat scores

It is amazing that just a little more than a year ago, most Wall Street analysts were writing off vendors of IBM Personal Computer-compatible systems as sure victims of IBM's market clout. Early in 1985, the conventional view in the financial community was writing the obituaries of all the other vendors.

Of course, that wasn't how it happened at all.

Users, being typically less well paid than the Wall Street pooh-bahs and technically a lot smarter, had little difficulty recognizing a good deal when they saw one. Not only did the compatible vendors offer IBM PC-, XT- and AT-compatible systems that did everything the IBM-labeled product did, but many actually did it better. Compaq Computer Corp.'s Deskpro 286, for example, might not have been any cheaper than an IBM PC AT, but at least the disk drives could be counted on.

Perhaps most important of all, compatible vendors began to offer not only more features on quality products but sharply lower prices as well. Tandy Corp., recovering from its not-invented-here syndrome, began offering aggressively priced systems in 1985. Leading Edge Products, Inc. became both a price and a market leader at the low end, and Zenith Data Systems Corp. began taking big government contracts, largely by knocking the socks off IBM's pricing.

But for really aggressive prices, it was initially the then-unknown mail-

See **COMPATIBLES** page 31

Zachmann is corporate vice-president for research at International Data Corp. in Framingham, Mass.

Board ups PC speed, aims to open door for Windows

By Peggy Watt and Douglas Barney

REDMOND, Wash. — Microsoft Corp. is paving more paths for its Windows graphical interface with the introduction last week of Mach 10, an add-on board that more than doubles the speed of IBM Personal Computers, PC XTs and compatibles, along with a new mouse and graphics input interface.

Mach 10 is aimed at quelling users' complaints that Intel Corp. 8088 microprocessor-based machines were not fast enough to run Windows effectively and required the faster processing speed of Intel 80286-based machines. "We think Mach 10 will allow corporations to move to Windows without having to upgrade their machines," said Michael S. Cooper, manager of Microsoft's hardware group.

The Mach 10 has a dual-speed mode and can run at nearly 10 MHz or can switch to 4.77 MHz, the standard speed of 8088-based machines. The slower speed is necessary to accommodate the copy-protection schemes of some older versions of software packages. "We don't anticipate too many compatibility problems there," Cooper said. Mach 10 also supports an optional Intel 8087 math coprocessor.

The Mach 10 replaces the 8088 processor and runs on the IBM PC, PC XT and Portable PC, along with many compatibles, including the original Compaq Computer Corp. Portable, the Ericsson Information Systems, Inc. PC and the Leading Edge Products, Inc. Model D.

In related news, Microsoft earlier this month announced Inport, a device interface that is being promoted as a prospective standard for both hardware and soft-

See **BOARD** page 28

Autodesk to rethink users group policy

Exposition melee may force firm to OK dealer sponsors

By Rosemary Hamilton

Bowing to user pressure, Autodesk, Inc. recently said it will reconsider its policy of not acknowledging users groups with dealer affiliations. Autodesk's decision came after what one user characterized as a "brouhaha" at the International users group meeting held at the Autocad Exposition in Chicago late last month.

"We would welcome a change in their policy," said Robert Hartman, a member of the Hawaii Autocad User Group. "Dealers are a good asset to a user group. We have one excellent dealer in Hawaii that's a member, but he's prohibited by Autodesk from sponsoring or organizing the group."

See **AUTODESK** page 30

Starbase takes laptop to office

By David Bright

NEW YORK — Last week at the PC Expo, Alloy Computer Products, Inc. introduced a storage subsystem for exchanging data between the IBM PC Convertible and desktop IBM Personal Computers. Alloy also unveiled Clusternet, an Intel Corp. 80286-based engine for multiuser personal computer clusters.

Framingham, Mass.-based Alloy Computer introduced the Starbase subsystem line with the belief that the PC Convertible is destined to see a great deal of use as a desktop system, not just as a portable computer.

"The PC Convertible's function is more than just carrying it with you on a trip," said Alloy President Dick Gorgens. "In order to use it effectively, you need some way of using it in the office. I like to think

See **STARBASE** page 28

NEW THIS WEEK

- Compuscan introduces PC-compatible page reader
- Mighty Computers offers 32-bit workstation

For more on these and other new products, see pp. 91, 102.

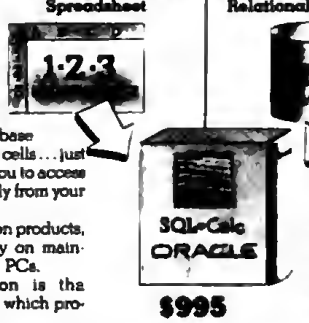
INSTANT ANALYSIS

"Philippe Kahn is selling software to himself. He is his typical customer, and that's how he's deciding what to market. But, so did Adam Osborne."

— George Morrow, chairman of Morrow Designs, Inc., commenting on the sales techniques of Kahn's Borland International, Inc.

Oracle's SQL★Calc makes a relational DBMS as easy as 1-2-3.

Oracle Corporation has developed a Lotus 1-2-3 compatible spreadsheet and integrated it with its ORACLE® relational database management system (DBMS). The new product, SQL★Calc,® is the first to combine a mainframe-class relational DBMS with an easy-to-learn and familiar PC spreadsheet user interface.



SQL★Calc is designed for 1-2-3 users who've run out of memory, flexibility and patience. SQL★Calc allows you to put SQL database commands into spreadsheet cells . . . just like formulas. This permits you to access large amounts of data directly from your spreadsheet.

Like all Oracle Corporation products, SQL★Calc runs identically on mainframes, minicomputers and PCs.

SQL★Calc's foundation is the ORACLE relational DBMS, which provides users with a complete set of SQL commands through which they can create, retrieve, modify and otherwise control their data. SQL is the industry standard database command language for large computers. The SQL commands available in ORACLE are identical to the SQL commands in IBM's premier mainframe relational DBMS products, SQL/DS and DB2.

Relational DBMS

Built on this powerful DBMS foundation is a Lotus 1-2-3 compatible spreadsheet that allows users to put SQL commands into spreadsheet cells in the same way as they enter formulas. When a SQL command for data retrieval is entered into a spreadsheet cell, information is automatically retrieved from the database and placed into the spreadsheet. SQL★Calc also permits users to modify the database - and even create new database tables - directly from the spreadsheet.

SQL★Calc is easy to learn because its menu and command structure are compatible with those of Lotus 1-2-3. And SQL★Calc's ORACLE DBMS requires no supplement: It is vastly more powerful than the database components of 1-2-3, Symphony, Framework, dBase II, dBase III, or any other PC DBMS.

SQL★Calc is available immediately for IBM PC/XTs and ATs for $995.* SQL★Calc will soon be available on a wide variety of systems, including IBM mainframes, DEC, DG, and other superminis, and most UNIX systems.

For further information, or to order your copy of SQL★Calc, call 1-800-345-DBMS. Or write Oracle Corporation, Dept. CS, 20 Davis Drive, Belmont, CA 94002.

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Board speeds PC to run Windows

From page 27

ware developers seeking to integrate graphics input devices such as a mouse, Cooper said.

The mouse is also a handy, but not essential, part of Microsoft Windows, the graphical operating environment that is Microsoft's vision of the future for PC interfaces. Microsoft will bundle its bus mouse, the Inport interface, Windows and the Mach 10 board for $549.

The Inport interface includes a new 40-pin custom integrated circuit and small, 9-pin connector. The board with the new chip will be marketed with the current Microsoft Mouse replacing the logic circuits on the board.

The mouse chip supports not only the bus mouse but also digitizer pads, joy sticks and up to 50K bit/sec. two-way data transfer, Cooper said.

Microsoft will also continue to sell its serial mouse, which is more expensive because of its on-board intelligence, but which also enables a system with no free serial ports to use a mouse.

Though Microsoft is naturally regarded as a software company, sales of the Microsoft mouse have actually accounted for half of the firm's total product unit sales since its introduction three years ago, Cooper said.

"We're not in the hardware business per se, but with Windows and its graphical environment, we want to make sure there is a standard input for a graphical interface," he said.

Paradise Systems, Inc., Verticom, Inc. and Summagraphics Corp. announced they will support the interface in future products, and a Microsoft spokesman said several hardware vendors have indicated they will also support the interface.

In other news, Atari Corp. announced that it reached an agreement with Microsoft to market Microsoft Write for the Atari 520ST and 1040ST computers. Microsoft Write is based on the version of Microsoft Word written for Apple Computer, Inc.'s Macintosh personal computer.

Microsoft also announced Quickbasic, a Basic compiler, and a new C compiler. Both are easier to use and offer faster compilation speeds than previous products, said Robert Dickerson, group product marketing manager for Microsoft's language division.

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Starbase takes laptop to office

From page 27

that Starbase provides people with that ability."

According to Gorgens, the Starbase subsystem line, which starts in price at $1,995, essentially allows the PC Convertible laptop computer to function as a desktop personal computer by exchanging data with desktops and by providing 20M bytes of hard disk storage.

While the PC Convertible contains a 3½-in. floppy disk drive, the desktop IBM PC uses the industry standard 5¼-in. floppy drive. Starbase includes a 5¼-in. floppy that functions as an additional drive for the PC Convertible.

Using standard IBM PC-DOS commands, users can reportedly copy files back and forth between the two drives. This conversion capability will be important for PC Convertible users who do not have a desktop PC, as will the increased storage capacity afforded by the 20M-byte hard disk drive, Gorgens said.

Available next month, the Starbase-II and Starbase-III are each packaged in a box connected to the PC Convertible's expansion port by a 36-in. cable. The $1,995 Starbase-II includes a 5¼-in., 360K-byte floppy drive, a 20M-byte hard disk drive and a parallel printer port. The $2,495 Starbase-III also includes a 40M-byte, ¼-in. cartridge tape drive for backups.

A repackaged version of Starbase-II, called Starbase-I, has no connecting cable and, hence, must fit underneath the PC Convertible. Scheduled to be produced offshore beginning in October, Starbase-I will cost $1,495.

Alloy targets Clusternet

Alloy is targeting its Clusternet multiuser engine at value-added resellers that want to provide high-performance network hardware inexpensively in a small footprint. Because Clusternet can host up to 16 users and several Clusternet units can be linked together, a Clusternet configuration can serve as a cost-effective multiuser alternative to Unix-based supermicrocomputers, Gorgens claimed.

Clusternet runs applications software designed for the IBM PC, Personal Computer XT and Novell, Inc. networks. Novell-compatible file and record locking capabilities are included. Gorgens added that Clusternet's 16-slot, 16-bit bus provides plenty of expansion room for vertical applications such as computer-aided design and manufacturing.

The electronics for Clusternet are all contained in a floor cabinet. Each user is allocated a board containing an 8-MHz Intel 8088-compatible NEC Information Systems, Inc. V20 processor and up to 1M byte of random-access memory (RAM).

A four-user unit, priced at $14,995, includes the central 10-MHz Intel 80286 processor, 4M bytes of RAM, a 190M-byte hard disk drive, a floppy disk drive, a 120M-byte tape drive, two serial and two parallel ports and four terminals. The cost for each additional user is $1,600.

Alloy, which analysts say is strongest in the tape backup business, late last month filed for its first public offering.

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SOFTWARE INTERNATIONAL

masterpiece

Autodesk to rethink policy

From page 27

Autodesk is the maker of highly acclaimed microcomputer-based computer-aided design and manufacturing software. Since introducing Autocad in 1982, the company's installed base has swelled to approximately 50,000.

The company has maintained a policy of recognizing and supporting only those users groups formed and managed by users.

It has also said that dealers are welcome as group members, as long as they do not play an influential role in the group.

Early this month, a company spokeswoman said the policy, which has been evolving over the last few years, is under review.

> ***'I think the Autodesk attitude is self-serving. We're 56 Autocad users who aren't recognized by Autodesk.'***
>
> — Robert Sprowls users group founder

Currently, those groups authorized by Autodesk are placed on a referral list for new users.

The vendor helps new user-organized groups get started by alerting registered users in the group's geographical area.

"I think the Autodesk attitude is self-serving. We're 56 Autocad users who aren't recognized by Autodesk," said Robert Sprowls to Autodesk officials attending the Chicago meeting, regarding the Pittsburgh-based group he founded with a dealer.

Sprowls' comments were supported by many attendees at the users group meeting, who claimed that they have the right to include whomever they want in their groups.

Swell of opposition

As the Autodesk policy was reiterated at the meeting by Sandra Boulton, an Autodesk marketing manager, the swell of opposition rose.

Finally, company President John Walker, who had been quietly sitting in the back of the meeting room, said, "For God's sake, what does it matter if a dealer is in a user group? I would say of the annoying people I've met, only a small percentage have been dealers."

In a series of interviews following the users group meeting, Autocad users said they believe dealer participation in their group is helpful because dealers are often more knowledgeable of the software and also have access to product information before users.

However, Autodesk has said dealer-organized groups can give those dealers an unfair advantage over other dealers.

Sales leads

As a users group contact person, a dealer is, in effect, receiving sales leads when Autodesk refers new users to that group.

David Cohn, an architect with Thorn, Howe, Stratton & Strong, a design firm in Memphis, and a member of the Memphis Autocad User Group, said his group decided to hold meetings on neutral territory after an experience with a dealer that left "bad feelings all around."

According to Cohn, the Memphis group, which is authorized by Autodesk, originally held meetings at various dealerships in that city.

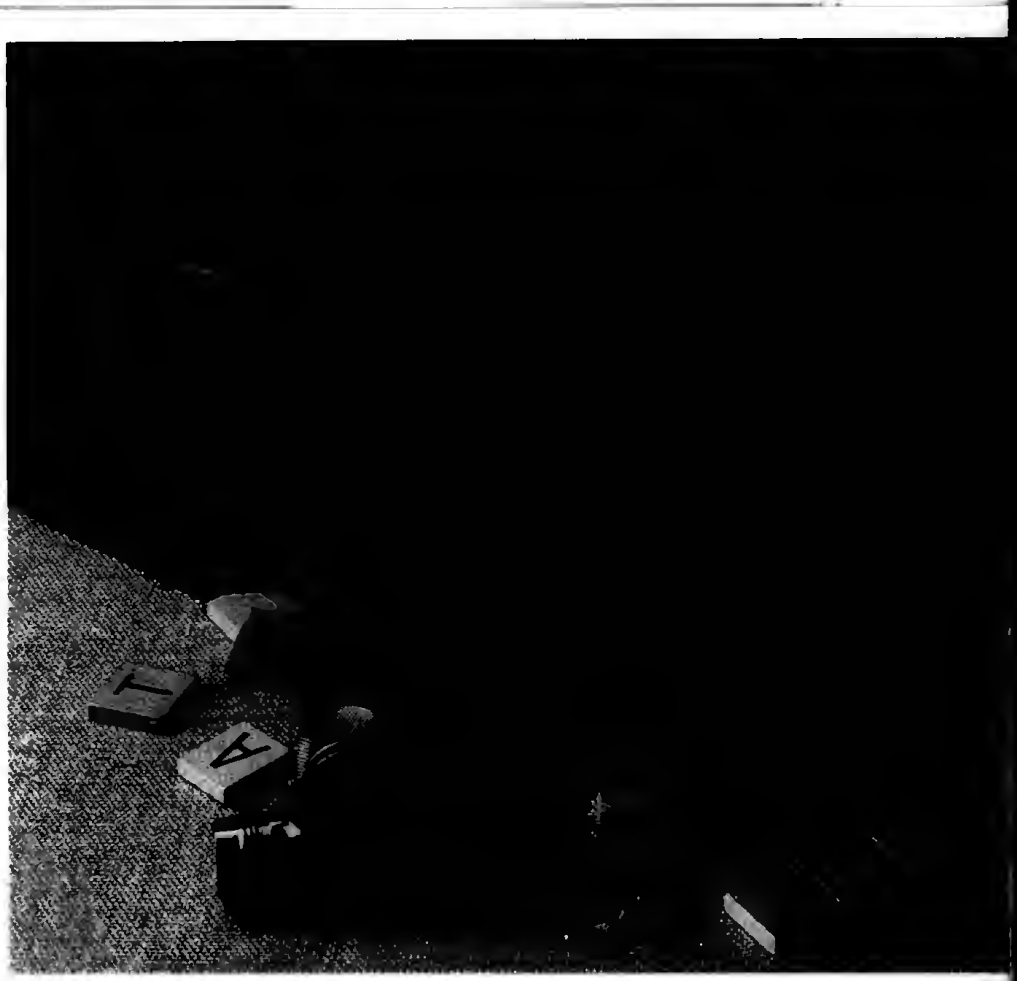
At one meeting, a user presented the idea of the group buying peripheral equipment in bulk by mail order to save money.

"The dealer really took offense, as if we were advocating mail order over dealers. He told us we were not welcome in his store again," Cohn said.

His group does not have any dealers on its board, but Cohn said dealer participation is essential and his group has many dealers as members.

Sprowls' Pittsburgh group is not authorized by the vendor because a local dealer is a cofounder and serves as technical director of the group. In addition, meetings are held at this dealer's site.

"I think it is up to the users how to run the group," Sprowls said. "We want to be recognized and be on their list. We can't get Autodesk people to speak at our group."



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AST-5250/ Async Dialup featuring multiple sessions

Compatibles: Telecat scores

From page 27

order brands like PC's Limited that pioneered low price points. True, they quoted bare-bones system prices without hard disks, monitors and, often, key adapter cards. But they still began driving home to users the evident fact that only bozos would pay IBM's list prices for personal computers.

Even 18 months ago buying a Compaq system was considered risky by many corporate buyers, but things are radically different today. Only the most die-hard believers among the Big Blue faithful are still willing to shuck out up to twice as much as necessary to often get not quite as much.

Buying less-expensive compatibles, adventuresome in early 1985, became acceptable late in that year and is getting downright fashionable today.

My personal computer hardware pick for July is an exciting new IBM PC AT-compatible entry: the Televideo Systems, Inc. Telecat 286. Not only is it from a vendor whose name is familiar to many larger users because of its terminal line, but the machine is priced quite aggressively.

Listing for $2,995 with a 20M-byte hard disk and $3,495 with a 30M-byte disk, the Telecat 286 offers an AT-compatible system for about the price of a PC XT.

These prices, although low compared with IBM or Compaq, may not seem all that aggressive compared with those of the mail-order vendors who now list AT-compatible systems as low as $1,495. The mail-order vendors quoting these prices, however, are listing a configuration without a hard disk, display adapter or monitor.

The Telecat 286 configurations include the hard disk, a Televideo monochrome monitor with a 640- by 400-pixel high-resolution graphics capability and a display adapter that supports stan'ard IBM color and monochrome graphics, the high-resolution monochrome capabilities of the system monitor (including a 16-value gray-scale mode) and an extended 16-color mode for standard color monitors.

With these capabilities, the Telecat 286 at list price looks quite competitive even with the mail-order systems from lesser known brand names, which are priced only slightly lower for comparable configurations.

Unfortunately, the extended graphics modes are compatible with neither IBM Enhanced Graphics Adapter (for color) nor Hercules Computer Technology, Inc. (for monochrome). This rather limits their utility since they are unlikely to be supported by most software vendors.

However, users with special applications willing to write their own software may find the enhanced graphics modes a plus.

For the rest of us, the Telecat 286's standard display card's compatibility with the IBM monochrome and GCA Corp. adapters will be sufficient.

Comfortable keyboard

The keyboard is comfortable and is laid out like the original AT keyboard but with LED indicator lights on the Caps Lock, Num Lock, and Scroll Lock keys.

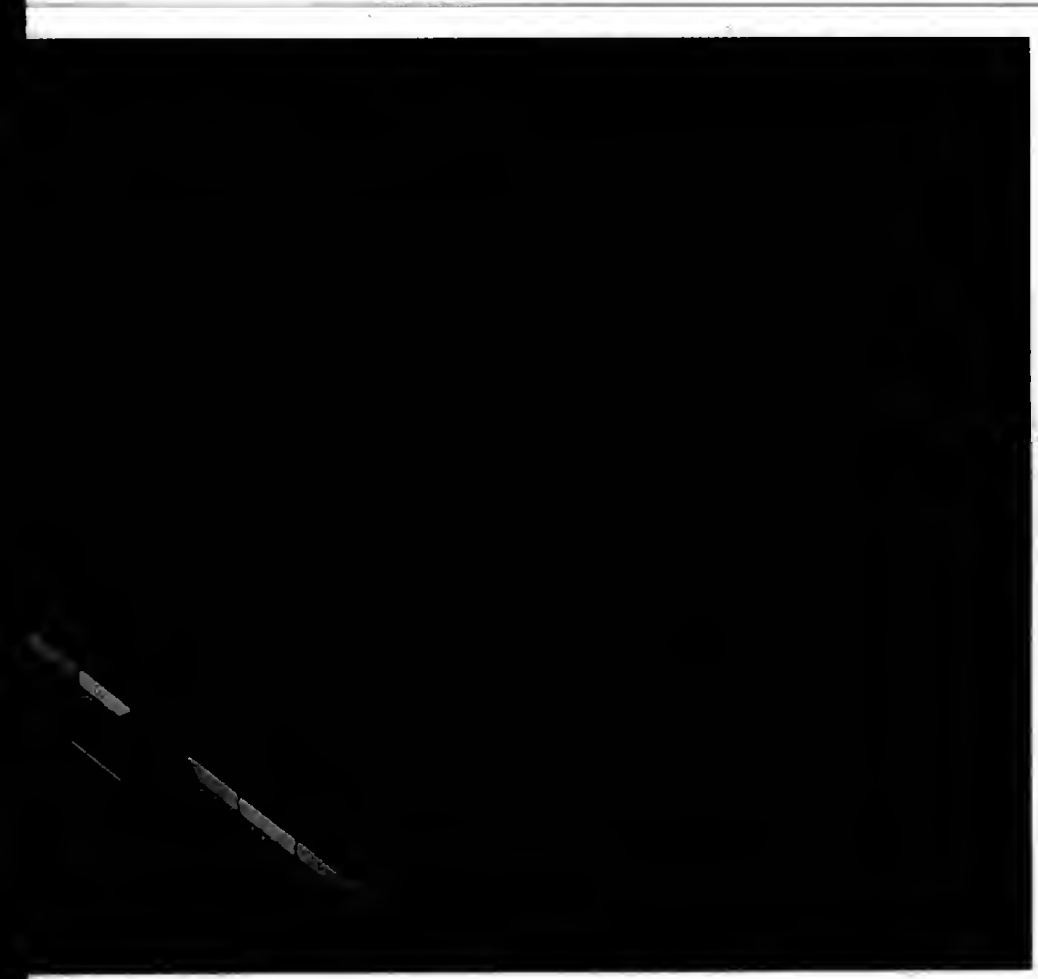
Not surprisingly, given Televideo's long experience in the terminals business, the display is comfortable, easy to read and quite impressive when the high-resolution monochrome capabilities are utilized.

Documentation is solid, although sometimes less clear than a beginner would like, especially as far as system setup goes.

The Telecat 286 achieves a relatively small footprint (compared with the PC AT) partly by mounting the system board in a removable tray at the bottom of the system. This, while an advantage should the system board need replacement, is rather an inconvenience in ordinary use.

All things considered, however, the Telecat 286 definitely gets my recommendation as an alternative to the IBM PC AT worthy of serious consideration by corporate users.

It is not only much less expensive and supported by a well-known vendor, but like many other compatibles capable of running at 8 MHz, it easily outperforms the standard AT as well. I suspect we will be seeing quite a few of them on the desks of corporate America.





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COMMUNICATIONS

DATA STREAM
Walter Ulrich

Networks for crisis coping

Many companies' communications facilities are inadequately equipped to handle the sudden increase in demand that often happens during a crisis. A business crisis, such as unwelcome attention from T. Boone Pickens, greatly increases the level of executive communication. A physical disaster, such as a flood or fire, can destroy vital records and interrupt operations to the point where a company is forced to go out of business.

Corporate communications networks are designed to support business activity at its normal rate. Insufficient communications setups can frustrate the company's attempts to deal with a crisis. No computer or communications manager wants his department to add to the chaos instead of improving the situation.

In today's on-line environment, restoring processing power and peripherals alone is not enough. Communications facilities must be restored in the computer room *and* the user community.

In the same way the MIS director prepares a disaster recovery plan, the communications manager must prepare a crisis control program that will enable him to respond effectively to crises. This program has three essential elements:

Introduce new communications technologies. They will then be available in an emergency. Once these technologies have been installed, a plan

See **NETWORKS** page 37

Ulrich is president of Houston-based management and technology consulting firm Walter Ulrich Consulting.

Broadband networks unite

Ethernet-MAP coexistence offered by Bridge, Chipcom

By Elisabeth Horwitt

Products recently unveiled by Bridge Communications, Inc. and Chipcom Corp. enable an Ethernet local-area network (LAN) to be implemented concurrently with other LANs on broadband cable, company spokesmen claimed.

The offerings will be attractive to medium and large companies — "people who have recognized that one network solution will not fit all their needs," said Harvey Freeman, vice-president of Minneapolis network consulting company Architecture Technology Corp. "I look for broadband to become the favored medium to tie everything together."

The Ethermodem Remodulator from Chipcom eliminates signal interference problems that sometimes occur when users implement a 10M bit/sec. Ethernet system, such as Chipcom's own Ethermodem, on a broadband cable that already supports other networks, Chipcom President Daniel Presser said.

Many of Chipcom's customers initially installed broadband to support a video surveillance system, a Sytek, Inc. terminal-to-host network or a factory network conforming to the Manufacturing Automation Protocol (MAP), he added.

MAP, from General Motors Corp., defines a token bus network that "takes up three channels, which are prime real estate on the broadband cable," Presser said. Chipcom's 8023HE Ethermodem Remodulator enables MAP and 10M bit/sec. Ethernet to coexist in adjacent channels without generating interference, he added.

See **BROADBAND** page 38

NEW THIS WEEK

- Votan offers voice mail system with recognition capability

■ For more on this and other new products, see pp. 91-102.

INSTANT ANALYSIS

"Centrex users are currently wondering how long they can put their telecommunications facilities in limbo. Telephone companies are offering a Band-Aid solution to their networking needs in the form of analog Centrex enhancements, and they don't know what the future holds in terms of digital services."

— John Powers, vice-president, strategic services, Telecom Management Corp.

Software vendors see light in Sun system

Recent offerings facilitate multivendor file exchange

By Rosemary Hamilton

Two communications software vendors recently jumped on the bandwagon of Sun Microsystems, Inc.'s Network File System (NFS), which, until now, has been licensed primarily by hardware vendors.

NFS software allows users on multivendor systems to exchange files transparently across a local-area network.

Multiplex/NFS, recently released software from Network Innovations Corp. of Cupertino, Calif., allows IBM Personal Computer users to pull data from Unix data bases on a Sun host and incorporate it into files generated by popular PC software such as Lotus Development Corp.'s 1-2-3.

Residing on a Sun Microsystems host, Multiplex/NFS works in conjunction with

See **VENDORS** page 39

Vitalink speeds up LAN bridge

By Stanley Gibson

MOUNTAIN VIEW, Calif. — Vitalink Communications Corp. recently announced Translan III, a bridge product that enables users to connect two Ethernet local-area networks (LANs) over terrestrial or satellite-based lines at rates of up to 2M bit/sec. Like Vitalink's earlier Translan II , Translan III operates at the data-link layer of the seven-layer International Standards Organization (ISO) model, enabling it to support a range of higher-level ISO protocols such as Decnet, Transmission Control Protocol/Internet Protocol (TCP/IP) and XNS.

"We're trying to take the geography out of the context of local-area networks," said Vitalink spokesman Paul Schaller. Translan III enables users on one Ethernet or IEEE 802.3-compatible LAN to communicate with users on a remote LAN as if all were located on the same local-area network, he explained.

See **FASTER** page 39

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Networks for crisis control

From page 33

should be prepared for using them effectively during a crisis.

Speeding communications

Several existing communications technologies speed communications during an emergency. Paging systems make it possible to reach people quickly, even when they are away from both home and office. Mobile radio helps people communicate while traveling to crisis management meetings.

Electronic mail greatly enhances an executive's ability to obtain vital information, and voice mail enables managers on the road to call in for information using a Touch-Tone telephone.

Videoconferencing can bring people together over long distances on short notice.

Here is one case of how

> ***Several existing communications technologies — paging systems, mobile radio, electronic and voice mail, videoconferencing — speed communications during an emergency.***

the right communications technology helped out during a crisis. When the space shuttle *Challenger* exploded, millions of schoolchildren were watching, including students in the Houston Independent School District (HISD).

The HISD is one of the largest school districts in the country, with 233 schools covering 312 square miles and educating 193,000 pupils.

The shuttle disaster created an immediate need to deal with the children's anxiety. HISD school officials and psychologists went into a quick huddle and prepared detailed instructions for all the Houston school district principals.

Thanks to an innovative electronic mail system in place at HISD, those instructions were in the principals' hands two hours after the shuttle disaster occurred.

Increase capacity of communications facilities. Arrangements to secure communications services for peak periods must be made in advance. Network hardware must have the capacity to handle additional communications ports. Sources of immediate supply for additional modems must be kept current.

Planning is simplified by the availability of on-demand network services available from value-added network suppliers, telephone companies and other carriers.

Subscriber agreements should be negotiated and plans made to bring services on-line during an emergency.

Set up alternative facilities. The configuration and backup of the network control center is of primary importance, as alternate routing across the network can provide needed redundancy. Standby public network agreements add further flexibility. Contingency plans for communications setups must be prepared and put in writing.

Revenue losses

A major U.S. company that is heavily dependent on voice communications sustained heavy revenue losses a few years ago. The common-carrier-supplied main trunk to its headquarters ran across a stream on a vehicular bridge.

When the bridge was washed out, the company was out of business for a day. Alternate communications would have meant rapid recovery.

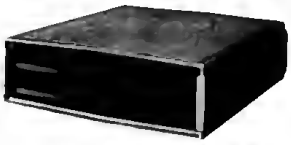
Backup facilities would have protected the revenue base for the company and maintained vital services for its customers.

The communications crisis control program is the key to preparing for future problems. Preparations and expenditures must be made carefully and conservatively. Investments in equipment must be minimized.

The program is one more job for the already overburdened communications manager. It is also a critical priority — the company's survival may one day depend on it.



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Concord Data Systems

Broadband nets unite

From page 33

"The need for high-speed, peer-to-peer communications is what usually drives users to install Ethernet," Presser noted.

Approximately 70% of Chipcom's customers are firms that have Digital Equipment Corp. installations and want to implement the vendor's Ethernet-compatible communications system, Decnet, he said.

Du Pont Co.'s Sabine River Works facility in Texas is in the process of installing the remodulator in order to solve interference problems generated by a Chipcom Ethernet network and a variety of other networks sharing the same broadband cable.

In the last eight years, the site has implemented a video surveillance network, several dedicated links between computers and Sytek's Localnet 20 on the cable.

Localnet 20 links a variety of computers and terminals from Hewlett-Packard Co., IBM and DEC, according to Du Pont senior engineer Randolph Knipp.

High-speed LAN needed

Approximately one year ago, the Sabine River facility decided it needed a high-speed LAN to link process monitoring and control machines to a technical center where computers perform statistical analysis and optimization.

Because the equipment is predominantly DEC's, Knipp's group chose to implement Decnet communications software on top of Chipcom's Ethermodem.

The initial test implementation worked well, but as soon as a Sytek System 2000 was implemented on the cable, interference problems surfaced.

"It was like two broadcasting stations trying to use the same channel," Knipp said. "We are convinced the remodulator will solve this problem."

Because Bridge's broadband Ethernet runs at 5M bit/sec. rather than 10M bit/sec., users should have no problem implementing it on the same cable as a MAP network, Bridge President William Carrico said.

The Bridge family of broad band Ethernet products supports multiple communications protocols, including the Transmission Control Protocol/Internet Protocol (TCP/IP), the company claimed. The products include the following:

- The communications server CS/1B links eight to 32 hosts, terminals and other devices to a 5M bit/sec. broadband Ethernet network that supports TCP/IP.

The 32-port version is priced at $15,600.

- The multiport bridge MB/1 is an eight-port bridge that enables Bridge and non-Bridge Ethernet products supporting TCP/IP to communicate with devices on the broadband Ethernet. For example, VAX minicomputers can communicate with devices on the network via a Unibus TCP/IP Ethernet controller from Excelan, Inc. The MB/1 enables multiple Ethernet LANs running on other media to be connected via a broadband backbone. The bridge is priced at $10,500.
- The channel remodulator CR/5 resides at the cable head end and performs packet regeneration, frequency translation and collision detection. The product is priced at $5,000.
- The radio frequency modem RFM/5 interfaces Bridge LAN servers with broadband cable. Its price is $795.

"What we're announcing is a complete broadband product line," Carrico said. The broadband interface supports the company's full line of Ethernet products, he added.

"We also bring to the party intelligent head ends and modems that automatically compensate for temperature changes, adding or subtracting of workstations and other changes that broadband cable is susceptible to. We're aiming at Ungermann-Bass, Inc., which also offers a 5M bit/sec. broadband Ethernet," Carrico said.

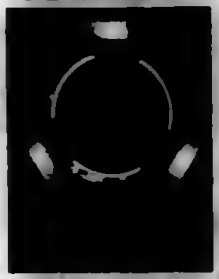
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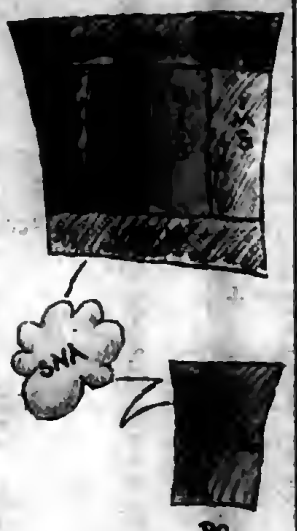
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Because Arbiter is a VTAM application, there are fewer layers of software between the PC user and the information, saving processor overhead. Even more efficiency is gained by Arbiter's advanced data compression scheme that uses your network more effectively than other products that transfer and receive data as 3270 screens.



As a subsystem, Arbiter is fully compatible with RACF and other popular security software. It also feeds data into IBM's SMF—data you can use to tune Arbiter. Or use for network capacity planning, usage accounting and auditing.

Faster LAN bridge out

From page 33

Translan III complies with the European T1 2.048M bit/sec. transmission rate and can also support the U.S. 1.54M bit/sec. rate, Schaller said. Translan II sends at 448K bit/sec.

Translan III operates independently of higher level communications software, because it functions on the data-link layer of the Open Systems Interconnect model, Schaller pointed out.

Vitalink's Translan products were codeveloped with Digital Equipment Corp. and are similar to DEC's Lanbridge 100. While Lanbridge consists of one box that connects two Ethernets at one point, Translan installs an interface on each cable, and it connects the interfaces over a long-distance, high-speed medium.

In satellite-based networks, the frame-address properties of Ethernet dictate that only the earth station to which the communication is addressed will actually receive that data. In this way, the network performs as s "distributed switch," Schaller said.
nect LANs via several parallel circuits. This feature is valuable because of the redundancy offered in case of line failure, Schaller said. The parallel-line feature can also provide load leveling or routing of calls to the line with the greatest available capacity, he added.

The product consists of a rack-mounted box with several ports: one for an Ethernet connection; four V.35 ports for digital circuits; one console port; and a printer port.

Vitalink also announced new software that will permit Translan II to communicate with Translan III.

Vendors use Sun system

From page 33

PC-NFS, Sun's recently introduced version of NFS for the IBM Personal Computer and compatibles.

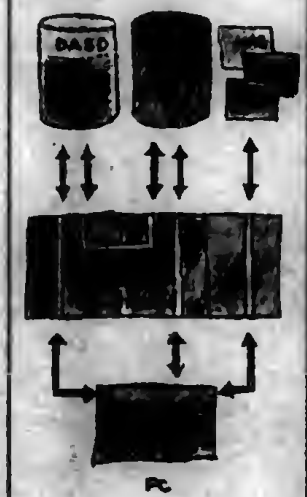
The Multiplex portion of the product provides the data extraction and automatic reformatting capability. The NFS portion provides the communications link and allows for the transparent sharing of these files, Multiplex President James Groff said. The company has been marketing Multiplex to run on a variety of local-area networks. The NFS version, priced at $1,195 for a single copy, will be available within 60 days of order.

The Wollongong Group of Palo Alto, Calif., will market an NFS option for its Wollongong Integrated Networking/VAX (WIN/VX) software. WIN/VX is an implementation of the Transmission Control Protocol/Internet Protocol communications software running under Digital Equipment Corp.'s VMS operating system. The NFS option will enable users of VAX/VMS systems to communicate with any other system supporting NFS.

The NFS option for WIN/VX is scheduled for shipment in October. It will sell for $5,000 in single quantity for the VAX version and $2,500 in single quantity for the Microvax version.



Arbiter has three components. The Remote Disk Environment (RDE) provides a seamless interface to remote disks on the host, which may be accessed by PC users or host-application programs. The External File Interface (EFI) transfers data to and from files on the host and the remote disks. The Interactive Session Relay (ISR) allows "power users" to connect a PC to another mainframe subsystem — for example, TSO or CICS — without disconnecting from Arbiter.



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SYSTEMS & PERIPHERALS

HARD TALK
Donna Raimondi

The great tape debate rages

Allegations that chromium dioxide cartridge data tapes may not be suitable for archival storage are drawing heated reactions from chromium dioxide's developer and from IBM, one of its major users.

Last month in this column, *Computerworld* aired the opinions of physicist William Manly, a consultant to the magnetic recording industry [CW, June 9]. Manly claimed that chromium dioxide-based tapes — such as the ones used by IBM in its 3480 cartridge tape system — are potentially toxic and short-lived.

Du Pont Co., the inventor and major marketer of the chromium dioxide magnetic particles used on the tapes, and IBM, which uses its own formulation of the material in its 3480 magnetic tape subsystems, take strong exception to Manly's views.

Manly, of HMI Consulting in Arlington, Texas, based his claims on his more than 20 years of experience with tape technology, including research work at tape manufacturer Ampex Corp. He stated that chromium dioxide degrades in the presence of moisture and oxygen to form chromium hexavalent compounds that are highly poisonous.

He further said that the tapes based on chromium dioxide have not been sufficiently tested to determine if they will last long enough to be useful for archival storage.

"Long-term testing has verified that our formulation of materials and manufacturing processes has produced a data processing tape product

See **GREAT** page 46

Raimondi is a Computerworld *senior writer.*

GE offers data base system

Office package combines GEscan and Microvax II

By James Connolly

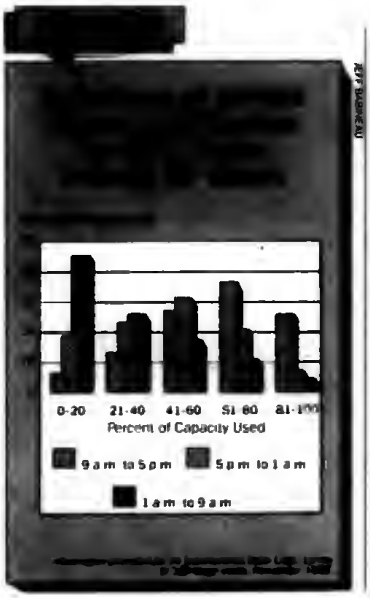
RALEIGH, N.C. — Seeking to expand its market from the federal government arena into the corporate world, General Electric Co.'s Silicon Systems Technology Department has announced a turnkey data base system.

GEfile includes GE's GEscan hardware and software sequential search and retrieval data base system as well as a Digital Equipment Corp. Microvax II minicomputer. The GEscan elements have been available previously through GE's Aerospace Division, which had sold 35 of the systems to the federal government. The earlier GEscan systems were integrated by the customers with larger DEC VAX superminicomputers.

"What we have recognized is that over the past couple of years in the government applications, the application there is not unique to government . . . but has broad commercial application. So in transferring the GEscan group down into the semiconductor business division, there is a commitment to take the GEscan product to commercial markets, as well as introduce specially configured products that meet specific applications and commercial markets," said Bill Geiger, manager of GEscan marketing.

While GEscan has been used by the government primarily in defense and intelligence applications, GE says it is useful for maintaining text data bases in fields such as the legal profession, sales and engineering, according to David Morris, manager of GEscan products. Target customers include organizations that have no access to mainframe data base management systems

See **GE** page 44



Priam unveils RT PC drives

By James Connolly

SAN JOSE, Calif. — With claims of price advantages over comparable IBM products, Priam Corp. has introduced a series of 5¼-in. Winchester disk drives designed for use with the IBM RT Personal Computer workstation.

Priam officials claimed its Innerspace family of add-in disk drives and Storagespace ED series of external drives provide capacities comparable to IBM disk drives, which cost up to twice as much. Each model is available with a controller that allows addition of a third disk drive to the RT PC.

The Innerspace 43M-byte and 62M-byte drives were designed for use with the floor-standing RT PC Models 20 and 25. The add-in kits cost $1,398 and $1,798 for the 43M- and 62M-byte versions.

The Storagespace ED drives were designed to fit beside the desktop RT PC Model 10. Prices range from $1,995 to $2,395.

INSIDE

CIE Systems offers an IBM-compatible color terminal/**43**

Tandem Computers unveils a 1,600 line/min printer designed for high reliability/**43**

Integrated Solutions adds Motorola 68020 and Unix-based nodes for heavy computational loads/**44**

NEW THIS WEEK

- Seikosha offers monocolor-to-color printer
- Laserlink announces add-on board for Canon laser printer

For more on these and other new products, see pp. 91-102.

INSTANT ANALYSIS

"If iron oxide tapes will last 30 years, so will chromium dioxide tapes."

— Robert Baer, Du Pont Co., on questions about the durability and safety of chromium dioxide tapes

Manufacturer pushes system to capacity and beyond

Upgrade not always preferable way to grow

By Rosemary Hamilton

PINE HILL, Ala. — Instead of trying something new, Jim Bonner, director of information services at MacMillan Bloedel, Inc., says he believes in maximizing the potential of what he has.

A Hewlett-Packard Co. user for five years, Bonner has tentative plans to upgrade his system later this year. However, he says he will not consider a move to the vendor's highly touted reduced instruction set computer (RISC) systems because his conventional HP 3000 minicomputer has adequately served his company's information needs.

Bonner says there is a 70% to 80% chance that by year's end his company will purchase a traditional architecture HP 3000 Series 70, a system announced earlier this year with the debut of the RISC systems, formally known as the HP Precision Architecture computers.

The Series 70 was offered as an upgrade to the HP 3000 Series 68. It is said to offer 30% more performance than the Series 68 and costs $30,000 as a field upgrade.

"We're very interested in the RISC systems and have enough confidence in HP to believe that what it's selling will work," says Bonner, whose firm is the U.S. subsidiary of MacMillan Bloedel, Ltd., a Canadian producer of lumber and paper. "But our business is in a constant state of generating information. I don't have an adequate plan should we get behind. So I wouldn't bring in a solution until it's proved itself in the marketplace."

Furthermore, Bonner says, his department has been able to expand the capabilities of the HP 3000 beyond its traditional use as a business computer by adding proprietary applications for the production processes, the heart of MacMillan Bloedel's business.

The U.S. operation is made up of the Pine Hill headquarters, a sales office in Atlanta and 15 plants along the East Coast. Bonner estimates that the company produces 65 million feet of structural grade lumber, 135 million square feet of plywood, 430,000 tons of liner board and 210,000 of corrugating board each year.

MacMillan Bloedel now uses two HP 3000s. A Series 68 with 5M bytes of main memory is used for office applications, and a smaller Series 40 with 1M byte of memory is used to manage the company's production processes.

Approximately 40 HP Touchscreen Personal Computers and 68 HP terminals are located throughout the U.S. offices and linked to the minicomputers via the HP Distributed Systems Network link.

The centerpiece of this system is the HP Image data base management system, Bonner says. MacMillan Bloedel uses in-house applications to interface with Image for both the administrative and production sides of the business. As a result, production data on such items as raw material are immediately available to sales personnel.

See **MANUFACTURER** page 44

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CIE Systems terminal out

Said to offer color, improved resolution

By James Connolly

IRVINE, Calif. — CIE Systems, Inc. has introduced a color terminal that reportedly is plug compatible with IBM's 3179 and 3279 terminals and that provides a 25% improvement in screen resolution.

CIE Systems, a subsidiary of C. Itoh Electronics, Inc., claimed that the CIE 7900 Executive Color Terminal improves text readability through use of a .28-mm dot pitch.

It also uses a 122-key keyboard for 3179 compatibility or an 87-key keyboard for 3279 compatibility.

Function as monochrome terminal

In addition, the company claimed the terminal can function as an IBM 3178 or 3278 monochrome terminal in a coaxial environment or as a Digital Equipment Corp. VT100 in an RS-232 asynchronous environment.

The terminal, which was announced at the 1986 National Computer Conference, costs $1,695.

CIE Systems also has announced that its Laser Optical Filing System (LOFS) will now be distributed through vertical market resellers, as well as through existing private-label channels in the general office industry.

LOFS, introduced in the U.S. in November 1985, is an optical filing system that the company claims will replace paper-based filing systems that require repeated access to information.

Officials of CIE Systems said that more than 25 of the LOFS systems manufactured by Hitachi, Ltd. are now installed in the U.S., and several hundred systems have been installed in Japan.

The system reportedly relies on data and image compression techniques to store digital images of up to 60,000 letter-size documents on a single 12-in. optical disk.

The single-unit, end-user price is $125,000.

Portable terminal ties to IBM minis

By James Connolly

LAGUNA HILLS, Calif. — Informer Computer Terminals, Inc. recently introduced a 14-lb portable terminal and a controller for use with IBM System/34, 36 and 38 minicomputers.

The System 300 Subsystem includes the Informer 251 terminal and the Informer 291 twinaxial remote terminal controller. The products provide all IBM 5251 and 5291 functions, including status line, field separation and keyboard emulation.

"The unique advantage offered by the Informer System 300 is its ability to connect remote users via standard public phone lines," company President Lars Persson said. He said the terminal is particularly suited for users who travel and need access to their company's central data base.

According to the vendor, users can support up to seven Informer 251 terminals to the Informer 291 through RS-232 lines or through an integral modem contained within the Informer 251.

The terminal costs $2,190, and the controller costs $2,545.

CORRECTIONS

The Tandem Computers, Inc. Nonstop VLX system [CW, April 21] can grow from a four-processor base in single-processor increments up to a maximum of 16 processors in a system.

Tandem Computers line matrix printer targets high throughput environments

By James Connolly

CUPERTINO, Calif.— Tandem Computers, Inc. last week added to its line matrix printer family with a printer designed for use in environments requiring high throughput and high reliability.

The 5518 line matrix printer reportedly prints at 1,200 line/min using standard fonts and at 1,600 line/min using an optional high-speed font.

The company said that the printer's reliability is improved because of the mechanism's small number of moving parts. The printer reportedly requires no scheduled maintenance. Microprocessor controls are said to isolate most failures at the board level, according to Tandem officials.

"Through the use of advanced line matrix technology, we are offering our users a high-performance printer that combines versatility with high speed and high throughput. This technology provides a degree of reliability that complements Tandem's Nonstop computer systems," said Lawrence A. Laurich, vice-president of engineering for Tandem.

Existing members of the line matrix printer family are the 300 line/min 5515 and the 600 line/min 5515.

The 5518 costs $32,000.



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Unix-based nodes unveiled

By James Connolly

SAN JOSE, Calif. — Integrated Solutions, Inc., a subsidiary of NBI, Inc., has introduced two Unix-based nodes designed for users who run heavy computational loads without graphics.

The cluster compute node and the diskless compute node are based on the Motorola, Inc. 68020 microprocessor and VMEbus and the integrated Solutions TRFS extension of University of California at Berkeley Unix 4.2.

According to an Integrated Solutions official, the cluster compute node was designed to overcome the limited peripheral access of Ethernet.

The cluster compute node utilizes a 20M bit/sec. backplane for internetwork communications as well as private buses for accessing 4M bytes of memory.

It is priced at $5,900.

Field-installable

The company spokesman said the clusters are field-installable into existing Integrated Solutions Optimum V systems.

The diskless compute node is reportedly priced at $6,900 and is packaged in an eight-slot desktop enclosure.

It is said to feature four VME-expansion slots, 4M bytes of memory and an Ethernet controller.

GE releases office data base system

From page 41

and want data base systems that can be installed in an office.

Morris said GEfile is available in three configurations, each being built around GEscan and the Microvax. The GEscan system reportedly handles searches in a background manner, freeing the Microvax to handle other queries or general data processing. The GEscan connects to the Microvax's Q-bus via a direct-memory access interface card.

GEfile 1200 is the base system and includes a Microvax with 2M bytes of memory, a 120M-byte disk drive and a T3 version of GEscan. The T3 version includes a backplane and a T3 board with three text array processors. The GEfile 1200 was designed to store up to 50,000 pages of text and costs $64,900.

GEfile 3300 includes a Microvax with 5M bytes of memory, a 330M-byte disk drive and two three-processor boards. It costs $79,000.

GEfile 6600 was designed to handle 500,000 pages of text and includes 9M bytes of memory in a Microvax, 660M bytes of disk storage and a T12 version of GEscan with four three-processor boards. It costs $98,000.

Morris said GE provides users with the object code for GEscan, which includes the ability to build a data base. It also includes features such as query, audit trail, print, a thesaurus and what Morris called "current answer." The current answer feature, he said, allows a user to be notified when files are updated with data relevant to an earlier query.

Query options include a menu, a command-driven language and a single-time find, in which a user types in descriptions of the needed data. Morris said GEfile can handle queries of up to 3,000 characters, whether in a single query or multiple queries. Multiple queries are processed in parallel, he added.

Morris claimed that the system will search as fast as it takes to get information off the disk and that the system will display the first answers it gets from the data base even while searching for more query matches.

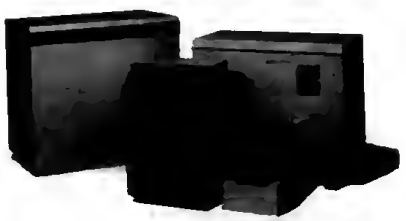
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Manufacturer pushes capacity

From page 41

Bonner says the company has developed its own software for two reasons. On the administrative side, some of the software has come from the parent company, where Bonner said there is a policy that their business is unique enough to warrant customized applications.

On the production side, Bonner says he could not find off-the-shelf applications for less than what it would cost to develop them in-house.

Originally leased IBM systems

The company originally chose HP in 1980 after using a number of different IBM systems on a lease basis, including the 360 Model 20 and the Series/1. At that time, the company operated in a batch environment. The same raw material data that can now be transmitted to the sales office immediately once took anywhere from 24 to 48 hours to process.

When MacMillan Bloedel decided to move from a batch environment, it wanted to purchase an IBM system. It chose the System/38 but then discovered it would have to wait a year for delivery, Bonner says. "We just didn't feel we could wait 12 months for IBM," he adds.

In addition to offering "terminal orientation and a good data management system," HP was one of the few vendors that could offer an adequate service contract, Bonner says. "We're about 100 miles from the closest city, and we found many companies couldn't fulfill our service requirements."

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The great tape debate rages

From page 41

that is highly reliable," IBM responded in a formal statement. "The chromium dioxide tapes are suitable for archival storage and safe for handling and use by our customers," the statement continues.

Du Pont's Dr. Bruce Karrh, vice-president of safety, health and environmental affairs, says, "About the only way you could be exposed to an unacceptable amount of chromium dioxide is in the manufacturing process."

Tapes that use chromium dioxide can be disposed of in the same manner as any other tape, he says about Manly's assertion that chromium dioxide tapes would have to be disposed of as a toxic waste, in a government-approved fashion.

Allegations unfounded

Manly's allegations are misleading and unfounded, the IBM statement says. "The magnetic particles in chromium dioxide-based tapes are fully encapsulated in an inert, nontoxic polymeric binder system."

IBM says that there is little likelihood of any dangerous degradation of the tapes in normal handling, and that both Du Pont and IBM tests show that the material meets U.S. Environmental Protection Agency requirements.

As for the longevity of the tape, Du Pont's Robert Baer, marketing manager for chromium dioxide, says there is no reason to believe that the tapes will last fewer years than the competing iron oxide-based reel tapes.

Du Pont performed aging studies with chromium dioxide-based tapes that indicate long life spans. "We believe that if the data center follows the tape manufacturer's recommendations, the chromium dioxide tapes will be absolutely functional for a long time. If iron oxide tapes will last 30 years, so will chromium dioxide tapes."

Temperature, humidity tests

The Du Pont aging studies consist of placing pieces of magnetic tape in a magnetometer and subjecting the tape to 65°C temperature and 50% humidity conditions for various periods of time.

Seven days in the magnetometer correlates well with real-life conditions to the tape's magnetic flux over a one-year period, Baer says.

It is the tape's magnetic flux that is being measured.

First-year loss

"Most of the magnetic flux loss that you will encounter occurs in the first year, and then to a much more limited extent in the second and third years. Beyond that, there is little change in magnetic flux character in all the chromium dioxide tapes we have ever examined — both tapes that we made and other people's," Baer says.

> ***'About the only way you could be exposed to an unacceptable amount of chromium dioxide is in the manufacturing process.'***
>
> — Dr. Bruce Karrh
> Du Pont Co.

Typically, 10% to 20% of the magnetic flux demagnetizes over the first two years, but this does not mean that 10% to 20% of the data written to the tape degrades.

It means that 10% to 20% of the surface of each of the many billions of magnetic bars on a section of tape converts from magnetic to nonmagnetic types of chromium.

Baer says that tape product designers build their hardware around the minimum flux that remains after the 10% to 20% degradation.

'Long-term stability'

"Results of tests clearly prove the long-term stability of the recorded signal," IBM says.

"As a matter of fact, IBM has provided a five-year product warranty on all 3480 chromium dioxide cartridges ever since we introduced the product," the IBM statement continues.

IBM started shipping the product early in 1985, but the company has been buying the chromium dioxide particles from Du Pont for at least six years, according to Du Pont's Baer.

Performance requests

Manly urged readers to ask their tape manufacturers for iron oxide-based tapes with performance equivalent to the chromium dioxide. He stated that manufacturers could supply the tape if customers asked for it.

But Baer says he doubts that one can get chromium dioxide performance out of iron oxide tapes. Iron oxide particles, used in reel tapes for many years, are not suitable for IBM 3480 cartridge tape, because they do not fit the system's high density requirements.

"The old iron oxide just will not work," he says.

There is a new iron oxide formula, but it has not been on the market long enough to determine if it is useful for cartridge tapes, according to Baer.

"The difference between the old iron oxide and the new one, that could possibly work with 3480 technology, is that the new one is doped with cobalt," he says. "We have tested cobalt tapes, but we don't know yet if they would work satisfactorily in a 3480-type environment."

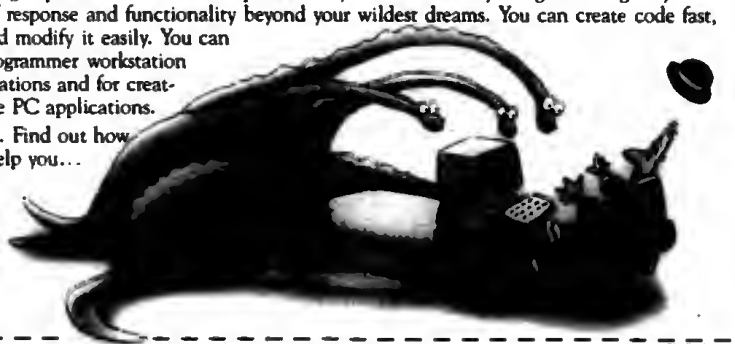


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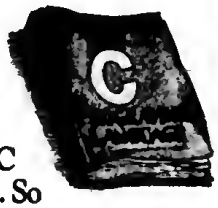
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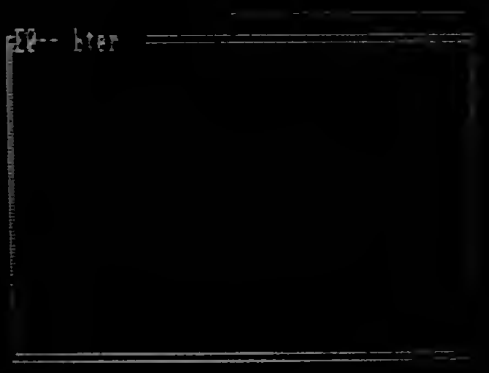


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Product Spotlight

Edited by Barbara Wierzbicki

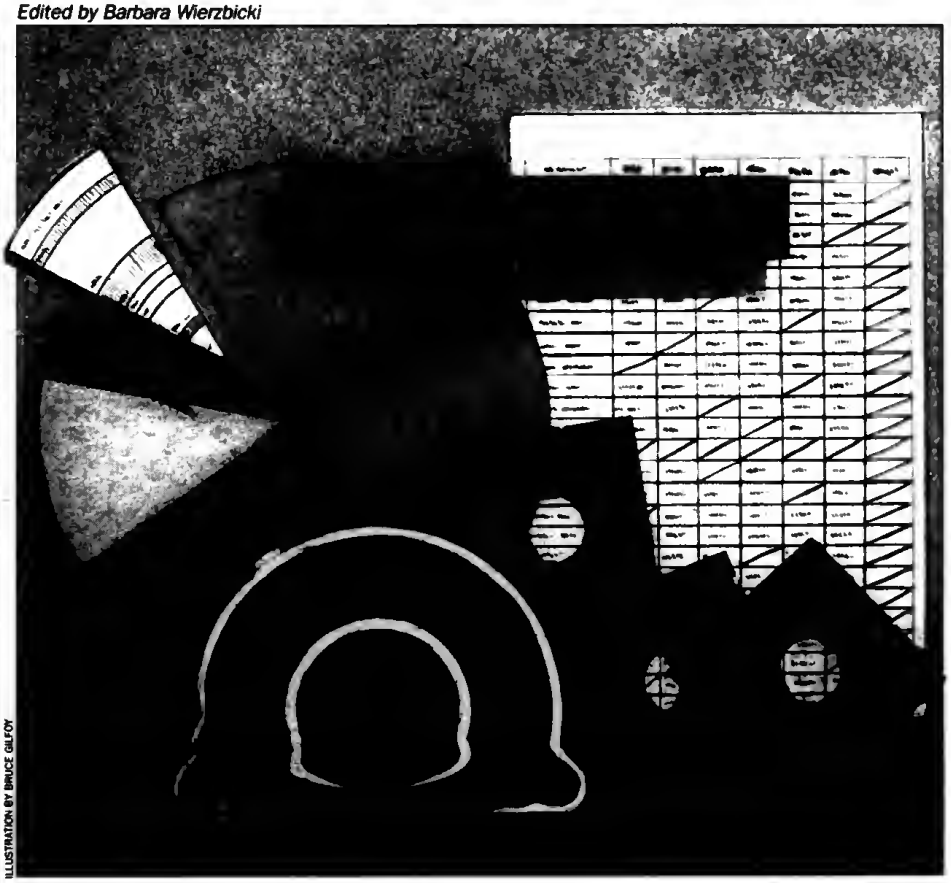


ILLUSTRATION BY BRUCE GILTOY

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Expert system shells

Design tools help MIS answer management's call

By MICKEY WILLIAMSON

Exaggerated claims for their effectiveness abound and so do skeptics' retorts. But the fact remains that within virtually every company in the Fortune 1,000, key management is deciding what repetitive or complex decisions could profitably be turned over to a computer endowed with a bit of intelligence.

Developing, or even advising on the development of, an expert system can be a daunting prospect to the MIS manager — particularly because the problems that expert systems attack differ fundamentally from those with which the DP manager is most familiar.

In the traditional data processing paradigm, problems are well defined. You can draw a flowchart and enumerate the control structure at every possible branch point. Logic finds data and decides what to do next.

The kinds of problems that management — and expert systems — attack are less well structured. Data may be incomplete or of uncertain accuracy. The MIS manager, whose training did not include ways of conducting heuristic searches through mountains of imprecise and possibly conflicting data, may find himself lost in a world where educated guesses and rules of thumb come into play. Control must be implicit: Data finds the rules that apply and decides what to do next.

Think of an expert system as a three-legged milking stool. One leg consists of the system's knowledge base: rules, static data, good guesses — anything an expert puts to use in solving a problem. (Anything except intuition, that is. Intuitive reasoning is still beyond the capability of any hardware and software combination.) An expert system's knowledge base may come from one or a number of human experts, from written materials or both.

The second leg is the expert system's inference engine: the way it applies information in the knowledge base to the problem at hand, the route it takes in applying data to the rules of the case.

The third leg — without which the system cannot stand — consists of information about a specific problem that the user wants solved. This information is supplied at runtime, either by the

Expert systems will soon be a given in software technology. Their developers — whether within DP or elsewhere in the company — will look to MIS for technical aid and comfort.

Williamson, a technical journalist based in Warwick, Mass., is the author of Artificial Intelligence for Microcomputers *(Simon & Schuster, Inc., 1986). She is currently writing a book on building expert systems.*

Design tools help MIS answer call

Continued from previous page

user or by routines in the expert system that look for data from external sources.

In the data processing shop, expert systems could solve some vexing problems. "There is the whole question of training and staffing, having the old hands leave the environment and bringing in new people," says Michael Stock, vice-president of advanced systems development at Composition Systems, Inc., an Elmsford, N.Y., company developing expert systems for newspaper production (see story page 50). A system incorporating the expertise of a programmer who is due to retire could train his replacement not only in the ways of data processing tools but also specifically in the ways they are used at a particular site, Stock explains.

Then there is the area of configuration analysis, performance monitoring and tuning. Probably the most successful expert systems in use today are Digital Equipment Corp.'s Xcon and related systems, which advise on the configuration and siting of every VAX computer that DEC sells. An inventive MIS manager could do worse than to consign his department's expertise in identifying bottlenecks and expert capacity to an expert system, according to Stock.

Building systems such as these requires capturing expert knowledge, encoding it in computer-readable form and giving the computer some means of reasoning and some kind of I/O system for rendering its advice.

Fortunately, a variety of tools exist that solve many of the design problems and let the developer concentrate on the user interface and on acquiring and expressing the expert knowledge on which the system will be based.

Expert system development tools, or shells, as they are often called — although some vendors object to the latter term because of the fragility it implies — come in a wide variety of sizes and shapes. These range from $50 personal computer-based packages — useful for exploring the possibilities that inference engines offer — through serious PC systems with far-ranging capabilities, to mini and mainframe development systems with price tags in the tens of thousands of dollars. Some of these run on dedicated symbolic processing machines that boost entry costs into the six-figure range.

Joseph Carter, senior manager in the consulting division of Arthur Andersen & Co., based in Chicago, categorizes expert systems and the characteristics of shells best suited to them in the following way:

Advisor systems represent the category most commonly associated with general expert system use. While these shells are typically rule-based, the more complex knowledge

Continued on next page



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Market for expert system shells breaking new ground

By SUSAN MESSENHEIMER

Since its modest beginnings in 1984, the commercial market for expert system tools has gained strength — and vendors. With the arrival of personal computer-based expert system tools, the market divides into two distinct sectors based on the kind of hardware upon which expert system tool software operates.

By the end of 1985, some 15 vendors of high-end tools had shipped products; add another 22 vendors of PC-based tools that were delivered to customers, and the expert system tools market includes over 35 vendors — with more on the way.

At present, these two sectors do not compete with each other, although there are indications that this may change, as tools developed on large symbolic processors are ported to smaller but increasingly powerful machines, such as Apple Computer, Inc.'s Macintosh and the impending generation of PCs based on 32-bit microprocessor chips.

Buyers of expert system tools tend to be large corporations and government agencies that use them to build expert systems for proprietary, in-house purposes.

According to our recent market research, the heaviest nonacademic users of expert system tools are manufacturing firms and those doing work in defense or other government contracts. Together, these users account for 60% of expert system tool usage. But interest in expert system tools has been increasing in such realms as banking, insurance and finance as newly competitive companies in these industries look for ways to develop a strategic edge over their rivals.

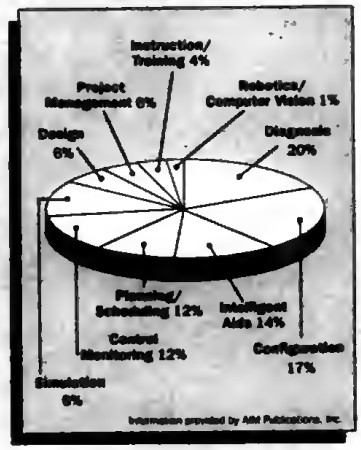
The problem domains in which expert systems have been put to work include the following:

- Diagnosis in computing, telecommunications, electronics, engineering, medicine, resource exploration and military applications.
- Configuration of computer systems, insurance policies and so on.
- Intelligent aids — in tuning systems, cost determinations.
- Control monitoring — accepting data from sensory inputs — as in process control of manufacturing plants and nuclear power plants.
- Planning/scheduling — in factories, military, finance and so on.
- Simulation — in manufacturing, design, decision support.
- Design — in manufacturing, software development, very large-scale integration and so on.
- Project management.
- Instruction and training.
- Robotics and computer vision.

Because they have a history of usage among defense contractors and in manufacturing, most tools are used in engineering applications. The MIS departments account for less than 5% of expert system tool purchases, but that, too, is starting to change as the profound potential of expert system tools becomes better understood. Examples of MIS use of these tools include the following:

- Travelers Insurance Co. of Hartford, Conn., is using Teknowledge, Inc.'s S.1 expert system tool to diagnose faults in DP equipment.
- Level Five Research, Inc. has built an expert system using its own product, Insight 2+, which aids in the planning and scheduling of software development projects.
- In a significant new development in expert system tool architecture, Software Architecture & Engineering, Inc. will soon announce its next-generation project, a specialized expert system tool geared for software development that combines knowledge base and software engineering. ■

HIGH-END TOOL USAGE BY APPLICATION



KEY GRAPHICS

> ***"MIS accounts for less than 5% of expert system tool purchases, but that is starting to change as their profound potential becomes better understood."***

Messenheimer is president of AIM Publications, Inc., a Natick, Mass.-based market research firm specializing in artificial intelligence commercialization that publishes the monthly "AI Markets" newsletter.

Continued from previous page

bases as well as those with a great number of rules will probably be best developed using a hybrid system — which includes both rules and frames — such as the Knowledge Engineering Environment (KEE) from intellicorp or the Automated Reasoning Tool (ART) from inference Corp. "The hybrid shells let you manage rules better. Including frames allows you to write more into the data structure and less into the rules," Carter says.

Decision support systems integrate data from diverse sources into a form that top executives can use to make business decisions. Complex data structures, the ability to express relationships and a good user interface are prime considerations. There may also need to be some rule processing ability, allowing the user to handle statements such as, "If this ratio is X, then inventories are too high." Programs such as Exsys from Exsys, Inc. and Guru from Micro Data Base Systems, Inc. fall into this category.

Decision analysis systems deal in planning and scheduling. They typically arrange and rearrange large numbers of variables and parameters to come up with a recommended plan or schedule: The shell in which a decision analysis system is built must not limit the number of variables and intermediate variables. A feature known as blackboard architecture, which allows the inference engine to consider a variety of possibilities at once, is useful here. A shell such as ART is especially well suited to decision analysis problems.

Systems that deal in soft and unstructured input, such as the Securities and Exchange Commission system (built by Arthur Andersen using the KEE shell) for analyzing corporate annual reports, need some type of natural language processing capabilities as well as the ability to manipulate complex data structures.

Flexible and maintainable systems, such as those used by insurance agents to generate client proposals, deal with domains where the rules are changed frequently and the knowledge base must be updated to take every change into account. "Most shells can be applied to this type of problem," Carter says. "Its complexity will determine whether it should be rule-based or hybrid." Teknowledge, Inc.'s S.1 and Aion Corp.'s Aion Development System/PC are among the most suitable shells for this type of application.

There probably is no shell in existence that does not require compromise at some point in the development process. Still, Carter advises, "You'll get a long way into your work before you're smart enough to realize what the limitations of these systems are, and until then you won't be qualified to write your own. . . . With a shell, you can be productive in a matter of days." Then he adds, "But it's like playing chess. You can learn all the moves in a couple of hours, but you don't master it for a long time because it's so rich. It helps to have someone around who knows how to put the moves to use."

Picking the right development shell

The way they reason, and the fact that they reason at all, make expert systems highly memory intensive. Where personal computers will be either the development or the delivery vehicle, 640K bytes of random-access memory (RAM) and a hard disk should be considered minimum requirements. If budget constraints preclude upgrading memory in existing machines, then considerations other than a package's RAM requirements may be irrelevant.

> ***An inventive MIS manager could do worse than to consign his department's expertise in identifying bottlenecks and expert capacity to an expert system.***

There are PC-based shells that require as little as 256K bytes of RAM, using additional available memory to conduct rule searches. They can hardly be expected to do serious work in minimally equipped computers.

Budget and memory constraints aside, there are several important considerations that must be weighed when picking any expert system development shell:

- The type of knowledge that is involved.
- The type of reasoning that is used.
- I/O requirements at runtime.
- Rule editing and debugging facilities provided.
- Vendor support.

Expertise in a subject area — a domain, in expert system terminology — usually comprises a variety of elements: vocabulary definitions, objects and the relationships between them, constraints, hypotheses, rules, heuristics and descriptions of processes and experience based on situations previously encountered.

Continued on next page

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Continued from previous page

This knowledge can be expressed in a variety of ways. Say, for example, that an applicant must show combined costs for housing and installment debt to be less than 32% of total income in order to qualify for a mortgage loan. That rule might be written: If the sum of applicant's housing costs and installment debt payments is less than 32% of total income, then applicant is eligible for a mortgage loan

This IF-THEN format represents the most common way of expressing knowledge in an expert system. Given the necessary data for a specific applicant, the expert system can look in its rule base and determine the applicant's eligibility

With sufficient effort, a developer can code a great deal of expert knowledge using shells based on IF-THEN rules, such as M.1 from Teknowledge, Exsys, Insight 2+ from Level Five Research, Inc. and ES/P Advisor from Expert Systems International. Some types of knowledge, however, lend themselves more readily to other representation schemes.

Where examples of successful decisions abound, but the rules behind them remain unclear even to the experts, an inductive system that generates its own rules from examples may be preferable. One method of expressing knowledge in an inductive system is called a decision matrix. It permits a series of attributes to be arranged in spreadsheet form with the right-hand column of the spreadsheet containing the conclusion. For example, attributes contributing to a weather forecast might include temperature, relative humidity, barometric pressure, direction of pressure change, wind direction and wind speed. Each row of the matrix would contain the instances of each attribute that would lead to a specific forecast.

A program such as 1st-Class from Programs in Motion, Inc. uses the decision matrix format. Other rule-by-example systems include Radian Corp.'s Rulemaster and General Research Corp.'s Timm PC. They use the same kind of algorithm for inducing rules but do not hold their knowledge in a matrix.

The most obvious way to express expert knowledge is to state facts and describe how they are related to each other, usually in a complex data structure called a frame. Shells with this capacity are the most effective method for describing complicated relationships, but systems built around frames are typically more difficult to program and debug

Frame-based representation schemes are found exclusively in minicomputer-based shells so far, because of the large chunks of memory they require. Some shells, however, known as hybrid systems, accept both rules and frames in the same knowledge base. Wizdom PX from Software Intelligence Laboratory, Inc., for example, solves the problem of describing complex relationships by linking factual statements in a relational network.

Related to the issue of knowledge representation is the question of how and by whom the expert system will

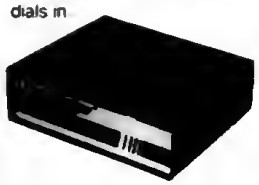
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Expert system shells at work in commercial environments

SHELL: Insight 2+.
BUILT BY: Lummus Crest, Inc., Bloomfield, N.J. (subsidiary of Combustion Engineering, Inc., Stamford, Conn.).
PURPOSE: Intelligent computer-aided design for in-house use.
DESCRIPTION: Lummus Crest uses Planned Design Management System (PDMS), an engineering modeling software system from Great Britain, to design process plants and oil and gas production facilities. The company added complex enhancements to PDMS. One of the added systems, built by design engineer Andre Maziarzewski, makes PDMS easy to use.

The Insight 2+ portion of Maziarzewski's expert system runs on IBM Personal Computer XTs and ATs and a Compaq Computer Corp. 286. The PCs use Microstuf, Inc. Crosstalk communications software to talk to a Prime Computer, Inc. 9955 minicomputer and Westward Technology, Inc. 2015 graphics terminals. Operators at the terminals fill in on-screen forms with about 40 variables taken from sketches done in the process department.

The expert system prompts the user for inputs and checks them for validity, commenting in a conversational manner when inputs are outside expected limits. Then it submits the resulting file to a drafting program, analyzing input data to select the drawing scale that will best display design details.

If there is too much demand on the system's resources, slowing response times to unacceptable levels, the system flashes a warning: "Too many users working; getting shorter on memory. I will be slower. Sorry."

SHELL: Knowledge Engineering Environment (KEE).
BUILT BY: Arthur Andersen & Co., Chicago.
PURPOSE: Analysis of corporate financial information, for use by the Securities and Exchange Commission (SEC), Washington, D.C.
DESCRIPTION: Federal law requires that all publicly held companies submit reams of financial data to the SEC, which investigates possible violations of the securities laws. An expert system reads corporate proxy statements with a sophistication unmatched by the average human investor.

Asked to identify companies that have taken action in the past year to dodge a leveraged buy-out attempt, for example, it searches for concepts rather than specific words, the way an investor who knew what to look for would do.

The system runs on Symbolics, Inc. 3600 and Xerox Corp. 1108 machines.

SHELL: KEE.
BUILT BY: Babcock and Wilcox Co., Lynchburg, Va.
PURPOSE: Welding advisory system for use by a construction subsidiary.
DESCRIPTION: The Weld Scheduler specifies welding procedures and inspection requirements to be used in on-site construction of coal- and oil-fired boilers.

The system combines the expertise of design and welding engineers. Its output is a set of instructions to welding technicians at the construction site.

Written in KEE on a Symbolics 3670 minicomputer, the Weld Scheduler's user interface is implemented on an IBM Personal Computer located in the Babcock and Wilcox Construction Co.'s office in Copley, Ohio. There users fill out on-line work sheets, providing data for about 30 welds at a time, then submit these sheets by telephone line for batch processing on the parent company's host Symbolics 3670 in Lynchburg.

SHELL: Automated Reasoning Tool.
BUILT BY: Composition Systems, Inc., Elmsford, N.Y.
PURPOSE: Newspaper management, for use by client newspaper companies.
DESCRIPTION: Slated to go into beta testing this summer, Composition Systems' Expert Publishing System is designed to take the crisis atmosphere out of daily newspaper operations. The system is composed initially of three separate systems that tie together the functions of advertising, page design and production.

The Expert Space Reservations System manages newspaper space allocations for ads and news, keeping a running inventory for every edition.

In the ad sales office, it also handles order processing functions, gives sales personnel intelligent advice about contract rates and sales opportunities and contains comprehensive MIS reporting capabilities.

The Expert Paper Layout System performs continuous real-time page design, determining the placement of ads so as not to conflict with news stories, adjusting layouts to handle late-breaking news and last-minute ad cancellations and making complex financial decisions centering on when to increase or decrease the number of pages in an edition. It also configures the presses and mediates between the often conflicting demands of the editorial, advertising and production departments.

The Expert Production Control System tracks the flow of editorial and advertising copy, allocates resources and schedules their use and predicts major demands for people, equipment and supplies to avoid bottlenecks and shortages.

Composition Systems' product runs on any Digital Equipment Corp. VAX/VMS processor. Configurations vary according to newspaper circulation size.

SHELL: Insight 2+.
BUILT BY: Bruce Olsen, vice-president, Seafirst Bank, Seattle.
PURPOSE: For Olsen's own use as a bank credit examiner.
DESCRIPTION: Olsen's job involves overseeing the credit quality of the people to whom Seafirst makes loans.

Three separate knowledge bases incorporate bank rules and policies concerning consumer auto leasing installment loans, purchase of new car loans from automobile dealers and the bank's personal revolving line of credit, which may be either unsecured or secured by a homeowner's equity.

Since most consumer credit is granted according to a technique called credit scoring, Olsen incorporated into his system about 10 pages of scoring rules taken from a manual that accompanied the bank's computer software system. The dealer auto loan system also contains internal bank policies and collection code rules, which determine how quickly the bank will respond if an account seems to be falling behind in payments.

The systems run on a Compaq Deskpro 5, a Microsoft Corp. MS-DOS machine compatible with the IBM PC XT.

— MICKEY WILLIAMSON

Continued from previous page

be developed. Often the task is a team effort, with the person possessing the expert knowledge teaching a programmer about how decisions are made. The programmer assumes the role of knowledge engineer — collecting and coding information and then working with the expert to validate the system by giving it additional problems to solve.

To make both coding and validating easier, the ideal expert system development shell reasons the way the expert does. Reasoning is the job of the inference engine; it is built into the shell.

Some inference engines, termed "forward chaining," look at the left-hand (IF) side of the first rule in the knowledge base and try to determine whether the fact it asserts is true. If the fact is false, the system moves to the next rule and tries to prove the truth of its assertion. When a rule whose left-hand side is true is located, the forward-chaining inference engine declares its right-hand (THEN) side true as well. The rule is said to have been fired, and the inference engine goes on to find another rule whose IF side matches the THEN side of the rule just fired, continuing in this way until no more rules can be fired. The system then reports its conclusion, if one has been found, or announces that it cannot draw any conclusions from the information at hand.

By contrast, the "backward-chaining" inference engine starts with a goal or hypothesis and works backward through the rules in its knowledge base, considering only those that are relevant to the goal. If X is the goal, a backward-chaining system looks for a rule whose THEN part contains X. Having found one, it inspects the IF part of that rule and looks for another rule that has the same terms in its THEN part, continuing until it fires all the rules necessary to prove X true. If it cannot satisfy the requirements for X, it picks another hypothesis and tries again or reports to the user that no conclusion can be reached.

Often a forward-chaining inference engine will have to pass over a rule, because it has not yet been proven true, only to return to it later when its IF clause becomes true. A similar process can occur with backward-chaining engines. This does not mean they chain in both directions; which side of the rule is considered first determines the direction of chaining.

Generally, a backward-chaining system runs faster for problems where the user seeks to select from a list of possible outcomes — as in diagnosing an illness or mechanical fault given both a set of symptoms and an educated guess as to where the fault lies. Forward-chaining systems perform more efficiently where a body of data must first be assembled to perform a task — as in configuring a computer system or selecting the best candidate to fill a hiring requisition given a set of performance or qualification criteria.

If an inference engine considers its job done when it finds a single valid conclusion, then the order of chaining may have a significant

Continued on next page

> ***'With a shell, you can be productive in a matter of days. It's like playing chess. You can learn all the moves in a couple of hours, but you don't master it for a long time because it's so rich.'***
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> — Joseph Carter
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FormSort	52sec	1min 5sec	1min 10sec

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Continued from previous page

effect on the expert system's advice. The direction of chaining is not always important, however. Richard Currie, systems development specialist in the research and development division of Babcock and Wilcox Co., an operating unit of McDermott International, Inc. located in Lynchburg, Va., found that the expert system he built using KEE performed identically when it chained in either direction.

"We chose KEE because it had both forward and backward chaining," Currie says. "We tried it both ways and didn't see any difference in performance, so we went with forward chaining, which seemed more natural to the operators."

Some shells allow either the developer or the user to determine the direction of the search. Moreover, some also permit the developer to determine the order in which rules will be considered by assigning priorities to them or by putting them into categories whose consideration is triggered by specific events. Certainty factors can be associated with rules that are in the knowledge base. Where statistical probabilities enter into an expert's decision making, a shell's certainty factor capabilities become important. For example, if Premise A leads to Conclusion B 75% of the time and to Conclusion C 60% of the time, then the shell should be able to contain that information.

It may also be necessary to allow the user to express confidence in the variables input at runtime. The user may be only 60% sure that Condition A exists. Numerous ways exist to combine the certainty factor of the knowledge base with the certainty factor of the user. Some methods yield more conservative results than others, but few shells offer more than one system for calculating certainties. One of the most sophisticated systems in this respect is Guru, a personal computer-based shell that runs under Unix and Microsoft Corp. MS-DOS.

Some expert reasoning involves pieces of data which, in expert system terminology, are called "fuzzy variables." It may be necessary to allow a user to answer a question at runtime with a list of possibilities, perhaps associating a different certainty factor with each. An inference engine that can handle fuzzy variables combines each of these variables with the applicable rules and comes up with a list of possible outcomes, each with its associated indication of probability.

The ability to select a threshold of certainty — to tell the inference engine, in effect, not to consider any outcome that has less than a certain percentage of certainty — is another desirable characteristic for many applications. Setting a high threshold can speed processing where only the most likely outcomes are useful. Some systems arbitrarily set the confidence threshold at 20%, causing rules to be considered and results to be reported that are too uncertain to be of any use.

Expert systems vary widely in their I/O requirements. Input needs may be as simple as plucking data from a Lotus Development Corp. 1-2-3 spreadsheet or as complex as reading data from a bank of process monitoring instruments. Advice may be required in real time or not; printing results on a terminal screen may be good enough, or written reports — with or without graphics — may be required. It may be necessary to store user inputs in a disk file along with the system's recommendations. Matching a system's requirements to a shell's abilities may mean setting priorities — or it may mean insisting on a shell that can reach out to the operating system to run programs written in other languages.

"Despite all the hype, you're not going to do a useful application without actually writing some code outside the shell," says Currie of Babcock and Wilcox. "So you'd better have a shell that permits you to get in and out easily."

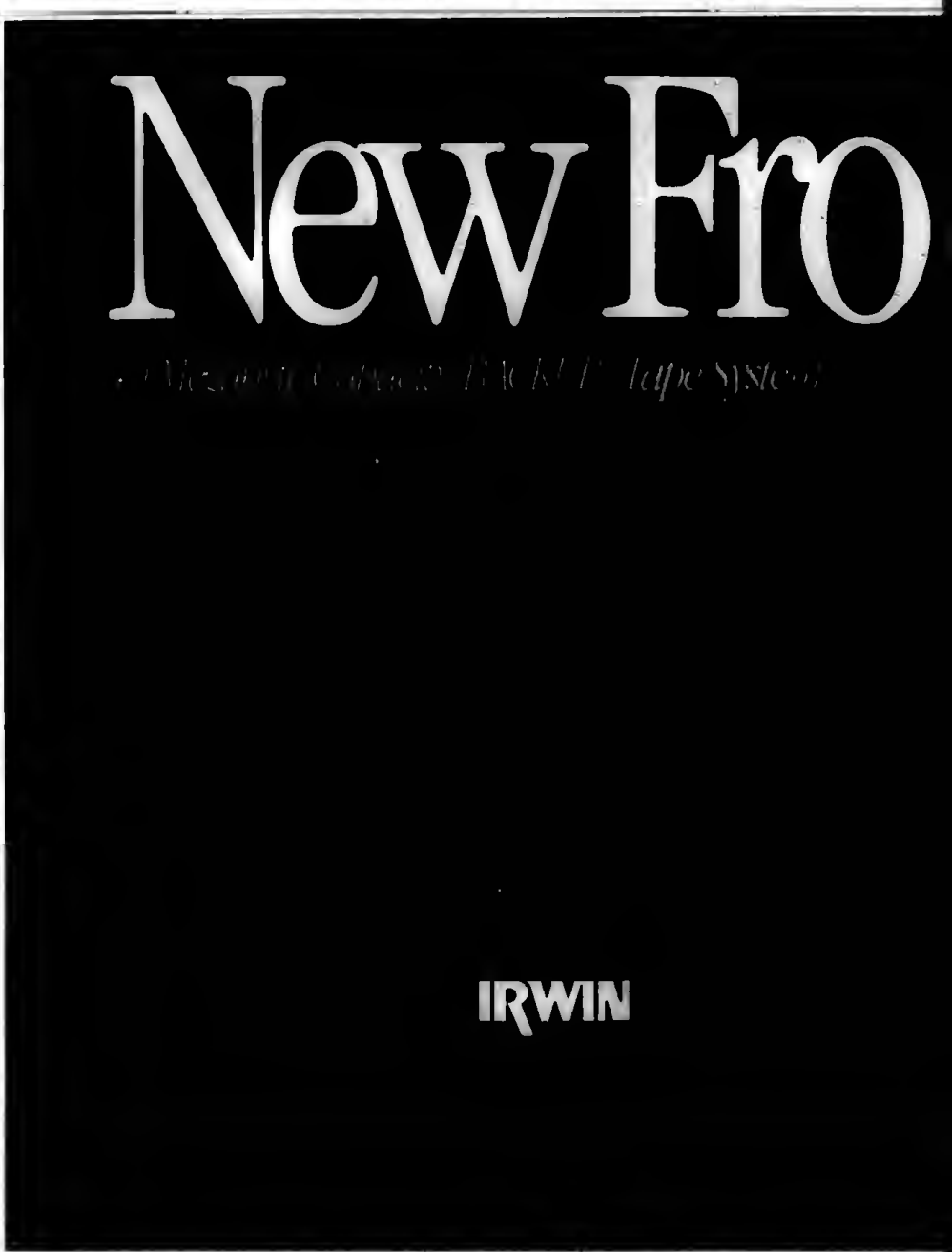
Programming the user interface can be especially important when the end users are not the same people as the experts whose knowledge the system contains. People can resist the introduction of expert systems for a variety of reasons. Some, such as fears about job security, are issues for management to handle. Others, such as ease of use and confidence in the system's abilities, must be dealt with during development.

John Kruse, senior software engineer at 3M Corp.'s software and electronic resource center in St. Paul, Minn., developed an expert system that helps chemists predict the physical properties of polymers they have synthesized.

Kruse says user patience can be strained if the expert system has to search a huge space to find its answers, but even slow processing speeds need not present a barrier to user acceptance.

"A human factors tactic is to make the system helpful enough so that the user knows when there's going to be a long wait," he says. "Nobody minds going for a cup of coffee while some work is being done for him." Users, Kruse adds, want "predictability and controllability of the system. If you do your human factors correctly, it should not be a problem."

Rule editing and debugging facilities are important considerations both for user acceptance and for ease of development. During the validation process, the experts whose knowledge is built into an



expert system need to look at the rules to trace their logic. If the rules are impossible for a nonprogrammer to read, debugging and validating the system are more difficult than they should be.

In Seattle, Seafirst Bank Vice-President Bruce Olsen — whose bank-credit expert system incorporates knowledge from books, manuals and bank policy statements — says the ability to ask a system how it reached its conclusion is a real asset. Usually, he notes, when an expert system exhibits faulty logic, it does so because it is lacking some key piece of information. To illustrate, he tells this story:

"I tried to plug our chairman of the board into my personal lines of credit evaluator. Since he leases a condominium — he doesn't own a house up here — the thing blew up and denied him any credit. I had to reason backward to find out where the problem occurred. It turned out I was missing a key rule."

Olsen says he would have spotted the problem faster if he had been more experienced in building expert systems and adds, "It sure was frustrating at the time. Asking how the system got there would have been darn nice."

> ***'Make the system helpful enough so that the user knows when there's going to be a long wait. Nobody minds going for a cup of coffee while some work is being done for him.'***
>
> — John Kruse, 3M Corp.

In some cases, a development shell's features can be less important than the nature of the company that supplies it. According to Thomas Freund, project leader in the manufacturing analysis group at Pratt and Whitney — a division of United Technologies Corp. — based in East Hartford, Conn., "If you are looking strictly at the kind of knowledge representation and so forth, you are going along a blind alley," he says. "It's important also to look at the company — at the direction in which they are heading, what kind of market they are targeting, what kind of applications."

Freund says his organization chose Carnegie Group, Inc.'s Knowledge Craft for its intelligent computer-aided design system because Carnegie is "heavily into manufacturing and engineering. People should look more at what a company is doing in their own area, rather than the fact that they sell this wonderful shell."

It is also important to Freund that the Carnegie Group maintains a consulting practice. "There has to be a value to having that consulting capability when you need it and to the fact that they are coming up with products geared to the kind of application you have in mind," he adds.

Some form of knowledge base security may be important in an expert system to protect the knowledge base from inadvertent corruption. Shells that offer a runtime version provide one form of security. In instances where it is desirable to keep users from inspecting the knowledge base at all — where proprietary information is incorporated into a novice training program, for example — tokenization or compilation is required. And compilation is a necessity where execution speeds are to be considered. "Running a shell interpretively and expecting to get any performance out of it is ludicrous," says Composition Systems' Stock.

It would be reasonable to wonder why a computer shop staffed with competent programmers should use an expert system shell instead of writing code from scratch. The answer comes in two parts. First, programmers tend to think in terms of procedures rather than in terms of problems, which is the way expert system development demands. Second, with their built-in knowledge representation schemes and inference engines, shells have done the less creative part of the work, leaving the developer free to concentrate on finding the best way to express the expert knowledge and develop the best possible user interface.

"An expert system shell works in much the same way as a problem-oriented fourth-generation language," Olsen observes. "A person who cut his eyeteeth on procedure-oriented programming can find making the transition a bit of a hurdle, but the training in logical thought is definitely a help."

The inferencing and knowledge representation techniques of expert system development had their origins in the artificial intelligence laboratories of the major universities, but the day is at hand when they will be taken for granted as a basic part of computer software technology — as unexceptional as a spreadsheet. When that day comes, if the expert system developers are not housed in the DP shop, then they will be spread throughout the corporation — and they will surely be looking to the computer room for access to data bases and for technical aid and comfort. ■

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EXPERT SYSTEM DEVELOPMENT SHELLS

		System Requirements		Knowledge Reasoning												
Vendor	Product	Minimum Memory Required (in bytes)	Requires Hard Disk	Rule-Based	Frame-Based	Example-Based	Forward Chaining	Backward Chaining	Runtime Version Available	Runs in Compiled Form	Performs Higher Math Computations	Runs External Programs	Text Editor	Data Import	Price
Alan Corp. 101 University Ave. Palo Alto, Calif. 94303	*ADS/PC*	512K	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Lotus 1-2-3, Ashton-Tate Dbase II, Dbase III, Micronm R:Base	$7,500
Arity Corp. 358 Baker Ave. Concord, Mass. 01742	*Arity/Expert*	512K	No	Yes	Yes	No	No	Yes	No	Yes	Yes	Yes	No	ASCII, Dbase II, 1-2-3, Lotus Symphony	$295
Artelligence, Inc. Suites 212-253 14902 Preston Road Dallas, Texas 75240	*Prodigy*	256K	No	Yes	No	No	No	Yes	Yes	No	No	Yes	No	ASCII	$450
Automated Reasoning Corp. Suite 1D 290 W. 12th St. New York, N.Y. 10014	*In-Ate*	512K	No	Yes	Yes	Yes	Not applicable	Not applicable	Yes	Yes	Yes	Yes	No	LISP, ASCII	$5,000
Automated Reasoning	*In-Ate**	Not applicable	Not applicable	Yes	Yes	Yes	Not applicable	Not applicable	Yes	Yes	Yes	Yes	No	LISP, ASCII	$15,000
California Intelligence #8, 912 Powell St. San Francisco, Calif. 94108	*Xsys*	640K	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	ASCII, IBM Data Interchange Format (DIF), Microsoft Sylk, 1-2-3, Dbase II, Dbase III	$995
Carnegie Group, Inc. Suite 650 Commerce Court Station Sq. Pittsburgh, Pa. 15219	*Knowledge Craft**	Not applicable	Not applicable	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	ASCII	$50,000
Expert Systems International 1150 First Ave. King of Prussia, Pa. 19406	*ES/P Advisor*	384K	No	Yes	No	No	No	Yes	Yes	Yes	No	No	No	ASCII	$895
Exsys, Inc. P.O. Box 75158 Contract Station 14 Albuquerque, N.M. 87194	*Exsys*	256K	No	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	ASCII	$900
General Research Corp. 7655 Old Springhouse Road McLean, Va. 22102	*Timm-PC*	640K	Yes	No	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes	Can be imbedded in other programs	$5,000
Human Edge Software 1875 S. Grant St. San Mateo, Calif. 94402	*Expert Edge*	256K	No	Yes	No	No	Yes	Yes	Yes	Yes	Yes	No	Yes	ASCII, DIF, 1-2-3, Dbase II, Dbase III	$795
Inference Corp. #501 5300 W. Century Blvd. Los Angeles, Calif. 90045	*Automated Reasoning Tool**	Not applicable	Not applicable	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	LISP	$65,000
Intellicorp 707 Laurel St. Menlo Park, Calif. 94025	*Knowledge Engineering Environment**	Not applicable	Not applicable	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	LISP	$55,000
Intelligenceware, Inc. Suite 730 9800 S. Sepulveda Blvd. Los Angeles, Calif. 90045	*Expertech*	256K	No	Yes	No	No	Yes	Yes	Yes	No	No	Yes	No	ASCII, Dbase II, Dbase III	$475
Intelligenceware	*Intelligence/ Compiler*	300K	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	ASCII	$990
IBM Corp. 934 Hunter Road Wilmette, Ill. 90091	*KDS Development System*	512K	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	ASCII, DIF, Sylk, 1-2-3, Dbase II, Dbase III	$945 to $970
Level Five Research, Inc. 503 5th Ave. Indialantic, Fla. 32903	*Insight 2+*	192K	No, but recommended	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	ASCII, DIF, 1-2-3, Dbase II, Dbase III	$485

The companies included in this chart responded to a recent telephone survey conducted by Computerworld. Vendor list supplied by the Quarry Group of Warwick, Mass. Further product information is available from the vendors.
*These shells are for use in minicomputer environments.

CW chart compiled by Michael Sullivan-Trainor and Christie Sears

Product Spotlight Expert System Shells

		System Requirements		Knowledge Reasoning											
Vendor	Product	Minimum Memory Required (in bytes)	Requires Hard Disk	Rule-Based	Frame-Based	Example-Based	Forward Chaining	Backward Chaining	Runtime Version Available	Rules in Compiled Form	Performs Higher Math Computations	Runs External Programs	Text Editor	Data Import	Price
Micro Data Base Systems P.O. Box 248 Lafayette, Ind. 47902	*Guru*	512K	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	ASCII, DIF, Sylk, 1-2-3, Dbase II, Dbase III	$2,995
Mountain View Press P.O. Box 4656 Mountain View, Calif. 94040	*Expert-2*	64K	No	Yes	No	Yes	Yes	No	Yes	Yes	Yes, with addition	Yes	Yes	DIF	$100
Portable Software, Inc. 650 Bair Island Road Redwood City, Calif. 94063	*XI*	512K	No	Yes	No	No	Yes	Yes	Yes	No	Yes	Yes	Yes	1-2-3, Dbase II	$1,250
Programs in Motion, Inc. 10 Sycamore Road Wayland, Mass. 01778	*1st-Class*	256K	No	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	ASCII, 1-2-3, Dbase II, Dbase III	$495
Radian Corp. P.O. Box 9948 8501 Mo-Pac Blvd. Austin, Texas 78766	*Rulemaster*	500K	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	ASCII	$995
Software Architecture and Engineering, Inc. 1500 Wilson Blvd. Arlington, Va. 22209	*KES*	640K	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	C	$4,000
Software Architecture and Engineering	*KES**	Not applicable	Not applicable	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	C	$7,000 to $25,000
Software Intelligence Laboratory, Inc. 1593 Locust Ave. Bohemia, N.Y. 11716	*Wizdom PX*	512K	No, but recommended	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	1-2-3, ASCII	$13,000
Systems Designers Software Suite 407 444 Washington St. Woburn, Mass. 01801	*Sage*	256K	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes	No	Pascal	$499
Systems Designers Software	*Invisage**	Not applicable	Not applicable	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	1-2-3, ASCII	$15,000 to $25,000
Teknowledge, Inc. 525 University Ave. Palo Alto, Calif. 94301	*M.1*	384K	No	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	C	$5,000
Teknowledge	*S.1**	Not applicable	Not applicable	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	C	$40,000
Texas Instruments, Inc. P.O. Box 809063 Dallas, Texas 75380	*Personal Consultant*	640K	Yes	Yes	No	No	Yes	Yes	Yes	No	Yes	Yes	Yes	LISP, Dbase II, Dbase III, 1-2-3	$950
Texas Instruments	*Personal Consultant Plus*	640K	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	LISP, DOS, Fortran	$2,950
Texpert Systems, Inc. 12607 Astee Houston, Texas 77065	*Class*	192K	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	C	$395
Texpert Systems	*Class**	Not applicable	Not applicable	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	C	$2,500


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65 Public Utility/Communications Systems/Transportation
70 Mining/Construction/Petroleum Refining/Agriculture
80 Manufacturer of Computers Computer-Related Systems or Peripherals
88 Computer Service Bureau Software Planning Consulting
90 Computer Peripheral Dealer Distributor/Retailer
75 User Other _____
99 Vendor Other _____

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12 VP/Assistant VP
13 Treasurer/Controller/Financial Officer
21 Director/Manager/Supervisor DP/MIS Services
23 Director/Manager of Operations Planning/Admin. Serv.
23 Systems Manager/Systems Analyst
31 Manager/Supervisor Programming
23 Programmer/Methods Analyst
39 OA/WP Director/Manager/Supervisor
36 Data Comm. Network Systems Mgmt.
41 Engineering/Scientific R&D/Technical Mgmt.
51 Manufacturing/Sales Reps/Sales Marketing Mgmt.
60 Consulting/Management
70 Medical/Legal/Accounting/Mgmt.
80 Educator/Journalist/Librarian/Student
00 Other _____

3 COMPUTER INVOLVEMENT (Circle all that apply.) Types of equipment with which you are personally involved either as a user, vendor or consultant
A. Mainframes/Supermins
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C. Microcomputers/Desktops
D. Communications Systems
E. Office Automation Systems

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In Depth

Review your annual reviews

How objectively do you evaluate your personnel?

Many DP managers look forward to personnel evaluations about as much as visits to the dentist. The author offers a painless cure: a matrix of performance standards for fair, well-structured reviews.

By JOHN CLARKE

Not too long ago, the senior management of a growing, service-oriented data processing department faced a dilemma. The department staff had recently grown, and the established methods of managing human resources clearly were no longer effective.

For the past several years, as the number of users and the size of the department grew, true seat-of-the-pants management worked, as it had since the days of the earliest mainframe. However, a sense of formal structure had recently started to evolve. Many functional groups within DP were becoming internally organized along product lines, with programming and analyst staff permanently assigned to certain users or systems.

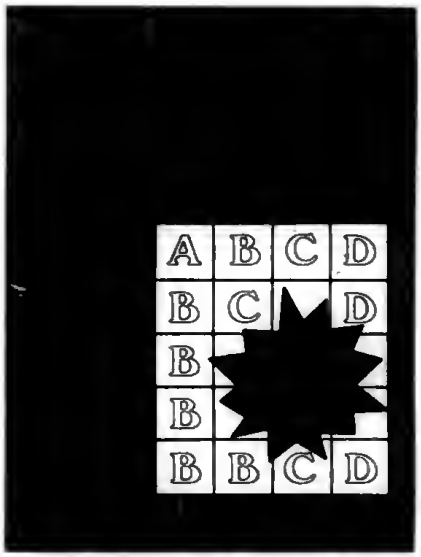
As these groups grew, it became impossible for one manager to administer all department activitles adequately. The result was the creation of a new layer of management at the functional group level, charged not only with total responsibility for a user's systems but also with supervisory responsibilities for the group.

The senior managers understandably were concerned that with more people performing supervisory tasks, personnel managers needed to be as objective and uniform as possible. In the past, all personnel performance evaluations were made by one senior manager. But that was to change; in the future more managers would conduct employee reviews. A method was needed to make sure that reviews were evenhanded and meaningful, regardless of the author.

However, the complexity of the task of implementing such a program soon became apparent. Developing an evaluation review form for one work group — in this case, the analysts — led to questions about what was appropriate to measure and how to express the measurements.

Next came questions on what was expected of different groups of analysts who performed different types of tasks and thus required different levels of skill in doing those tasks. When checking the files for specific job descriptions, the discovery was made that no such descriptions existed — previously there had never been time, much less the need, to write them.

Consequently, a potentially dangerous situation existed. Jobs were performed but never formally defined. Tasks were accomplished by a range of employees, but the level of competence at which each individual was expected to perform them was never determined. And out of this environment, objective personnel evaluations affecting promotions and salary increases were to take place.



Establishing the levels of skill required, with A designating the most skillful, for each job function can help standardize performance expectations for a specific job title.

What solved the organization's dilemma was the use of a structured process for specifying what was required of each job position and the levels of competence needed to fulfill the requirements. Once that process was implemented, a uniform system for evaluating actual performance — based upon the attainment of those standards — was put into effect. The result was an environment in which people knew what was expected of them, what it would take to advance up the organizational ladder and how each person's job performance ultimately would be evaluated.

Performance evaluation then and now

Many organizations fall into an all-too-familiar trap — rewarding or promoting an employee from one position to another solely because that person has been in a position for a predefined period of time. Rather than promoting or granting salary increases based strictly on longevity, it is better to reward the employee who can successfully perform specific job functions at a required level and demonstrates the necessary skills.

For this to take place, definite standards of required job function ability and skill

About the author
Clarke is a senior consultant with Positive Support Review, Inc., a management consulting firm based in Los Angeles.

> ***Rather than promoting or granting salary increases based strictly on longevity, it is better to reward the employee who can successfully perform specific job functions at a required level and demonstrates the necessary skills.***

must be developed and directly related to each job position. Following this, a process to formally evaluate employee performance can be implemented.

However, developing a description of what is needed to perform a given job adequately — along with a vehicle to determine if an individual demonstrates the ability to be successful at the job — usually gets deferred until it is too late to avoid confusion and problems. Too often the perceived complexity of the tasks needed to develop these tools makes it preferable to avoid doing them at all.

The easy solution historically has been to take a short-term perspective. This usually calls for dealing with personnel matters as rapidly and simply as possible and hoping there won't be any complaints. That approach works for a while. But as organizations grow, the short-term view quickly outlives its usefulness.

Obviously, time and resources must be devoted to developing a structured system of performance evaluation based upon job and skill requirements. Ultimately, however, the benefits of such a system far outweigh the costs of time and effort that go into the task. The key is in approaching the task one step at a time and in properly identifying and addressing what is necessary to do a job successfully.

The elements of performance

Three elements define a job and the performance of that job: functions, skills and objectives. The first two elements are indispensable to defining job requirements and evaluating performance, because they describe what is done and the level of ability needed to do it successfully.

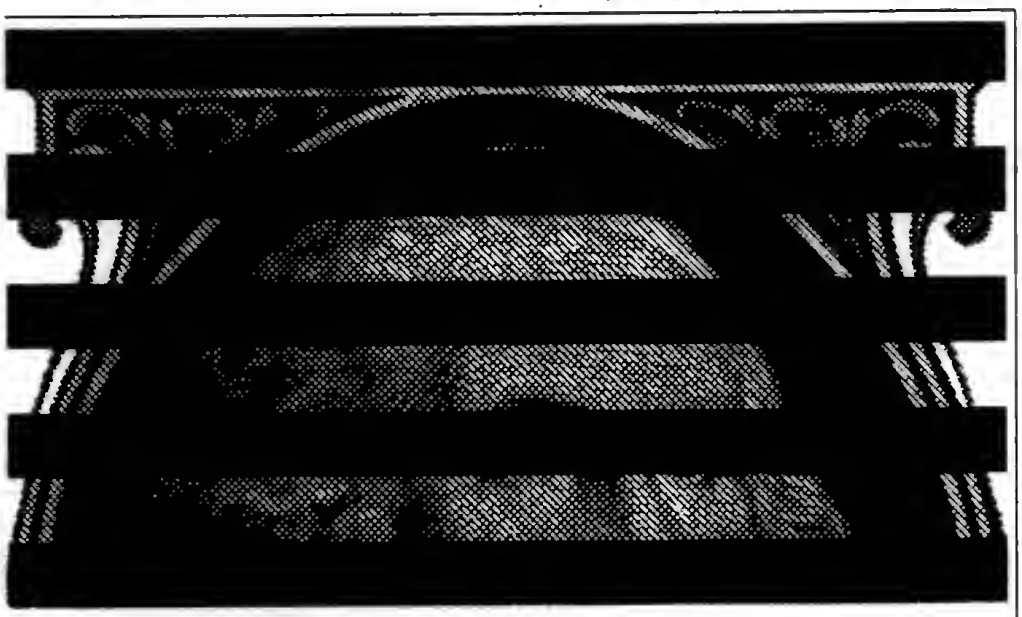
The third element — operational objectives — is an optional part of the process. Operational objectives usually involve managing the activities of others and thus are not appropriate for all employees. However, even when organizations do not establish formal operational objectives, the attainment of objectives is inherent in any measurement system where the employee being evaluated knows the areas in which the measures will be taken. Nevertheless, the use of specific operational objectives forms a valuable third measurement for those organizations that choose to use it.

The process described hereafter focuses on using the major elements — job functions and job skills — to develop individual performance standards and to assess the attainment of those standards in DP organizations.

Evaluation tools

Taking the two major elements and transforming them into sets of job descriptions, functional and skill requirement definitions and performance evaluations is a straightforward process — but one that is potentially time consuming for the uninitiated. Fortunately, one can take advantage of several tools for identifying and organizing the information needed to implement meaningful human resource management in a DP organization. These tools are job matrices, narratives that explain the different levels of job functions or skills and a common scale for use in evaluating actual performance.

Job matrices show the performance and skill levels that must be maintained across various jobs in a department. In terms of performance evaluation, job matrices allow employees to know what is expected of them in the categories under which they will be evaluated. As a



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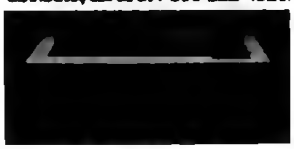
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> ***Developing a description of what is needed to perform a given job adequately usually gets deferred until it is too late to avoid confusion and problems. Too often the perceived complexity of the tasks needed to develop these tools makes it preferable to avoid doing them at all.***

tool for planning career development, matrices show how performance and skills must be increased in order to permit progression from one job to another.

Narratives explain what the different levels of performance mean, using quantifiable terms that are relevant to a particular organization.

A common rating scale is used to evaluate actual performance. Such a common scale establishes uniformity in the evaluation process. Performance is rated relative to whether the standards for the position have been met and thus eliminates much of the subjectivity found in many rating systems.

How these tools fit into the step-by-step development of requirements definitions, job descriptions and performance evaluations is discussed below (see chart page 66).

Step 1: Identify what is done. The first step of the process is to list the job functions performed as a normal part of business by a given group of personnel. Taking applications analysts as an example, the tasks that are part of the system development life cycle form the core of these functions. In most organizations, however, analysts perform functions beyond purely development-related tasks. Obviously, maintenance of ongoing systems is also a major responsibility, but what other functions do members of the group perform?

Lead analysts may get involved in management tasks, and most certainly all analysts perform at least some administrative tasks. What is important at this point is to identify the whole spectrum of functions performed by anyone or everyone in the group. It is not necessary that every individual perform every function on the list, but every major job function should be identified.

Step 2: Identify the skills needed to do the job. Most job skills in a DP organization fall into two broad categories: technical skills and people skills.

Identifying the technical skills is a relatively straightforward process, since the list is primarily an inventory of the technologies in use. Again, as with the inventory of job functions, it is not necessary that all individuals be involved in activities that utilize all the technologies.

For example, many firms use both batch and on-line applications as a part of business. More often than not, batch Cobol analysts focus exclusively on maintaining and enhancing these systems, while analysts working with CICS or other on-line technology applications concentrate on their areas of expertise.

Other areas not to overlook when compiling this inventory, even though they may just be coming into the organization, include fourth-generation tools, such as Information Builders, Inc.'s Focus, and microcomputer technologies.

People skills are necessary in any environment other than one in which the only contact employees have with one another is via notes shoved under closed office doors. (Even that requires a certain degree of written communication skill.)

As more and more DP organizations become actively involved in helping users implement information systems technology for competitive advantage, rather than merely for payroll and the general ledger, interpersonal and communication skills become increasingly important. Consequently, the people skills — and business skills — that the organization needs to get the job done

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should be identified and inventoried.

The lists of job functions and skills developed in Steps 1 and 2 will ultimately form the vertical axes of the job matrices. These axes depict the standards required for the various jobs in the department; the horizontal axes are the list of job positions themselves. However, there are still two more steps to perform before the matrices can be completed.

Step 3: Identify what is relevant to becoming successful. Once job functions and necessary skills have been identified, the next step is to identify the components of the skills that are relevant to the performance of specific functional tasks.

For technical skill areas in a DP organization where analysts analyze and programmers program, programmers need to be adept at certain aspects of the language in use that are not necessarily part of the realm of the analysts. For example, the components of technical skill that a programmer working with Lotus Development Corp.'s 1-2-3 should be expected to have mastered would include writing macros and using other automated tools for manipulating very large spreadsheets.

On the other hand, an analyst would not necessarily be expected to write the specific macro but instead would need to know the capabilities and limits of using macros and be able to integrate their use into a well-structured application.

The components of people skills tend to be relatively universal. The classic example is the definition of management, the components of which include, at the least, planning, organizing, directing, monitoring and reviewing. The components of interpersonal skills may be more nebulous to define, but it is possible to accomplish the development of identifying labels for these components with a reasonable investment in time.

Step 4: Define progressive levels of performance and skill. The next step is to define what constitutes distinct plateaus of performance and skill. Using measures in terms that are appropriate to the organization, sets of progressive levels of performance and ability — from entry level to expert — are identified. For job functions, in many cases it is appropriate to express performance levels in terms of the relative independence with which the function can successfully be performed — under close supervision, under minimal supervision, given general direction and so on.

While for job functions it is often possible to use a single scale for all elements, skill areas almost invariably resist the use of such a tool. The components of technical skills just cannot be easily expressed in the same terms as communication skills or management skills. Consequently, distinct scales for technical skills and each of the people skill areas will need to be developed.

> ***The narrative serves as a valuable tool for career development because it helps answer the questions employees always have about what it would take to be considered for advancement to another job level.***

At the same time, the narratives associated with the individual levels are developed. Each narrative spells out, in plain English, what a certain level of ability is. In certain job functions and technical skill areas, quantifiable terms can be used: "Averages 95% of error-free code."

For areas that are not easily quantified, the different levels can be distinguished through other means. For example, the application of written communication skills can be assessed by identifying the nature of the written documents produced and to whom they are addressed. In

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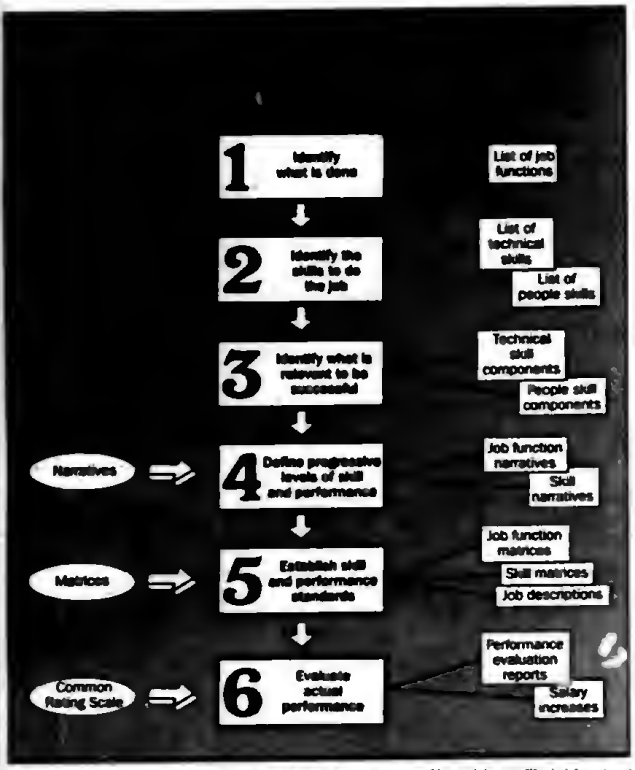
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Defining requirements and expectations for each staff position will yield output in the form of lists, narratives and matrices that help eliminate ambiguity and establish clear yardsticks for performance.

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a second example, progressive levels of microcomputer skills can be narrated as follows:

A. Expert in the use of the IBM Personal Computer; adept at complex DOS commands, all major software packages in use and network and communications functions.

B. Proficient in use of PC, infrequently needs support in use of complex DOS commands, efficiently operates five major software packages, strong working knowledge of network and communications functions.

C. Competent in use of PC, efficiently uses major DOS commands, efficiently operates at least three major packages, working knowledge of network and communications functions.

D. Familiar with use of PC, can use some DOS commands, knowledge of one major software package.

E. Limited experience with PC, requires basic or review training.

Once the standards have been defined, detailed descriptions can also be developed for each job position. Using the narrative associated with each function or skill standard, job descriptions become very relevant. This is because they specify not only what is to be done by the incumbent of a job but also at what level of competence it is to be accomplished. The narrative also serves as a valuable tool for career development because it helps answer the questions employees always have about what it would take to be considered for advancement.

> ***"Without a structure to set standards and rate achievements, the process consists of the manager forming an opinion of an employee's work and then struggling for the best way to express that in writing."***

Step 5: Establish standards. The next step is to establish performance standards. Following the definition of the applicable scale(s) to be used, the level of performance or skill that is to be expected from personnel in any given job is determined for a specific function. The skill narratives listed above are based on a standard structure of progression through four or five levels. Levels A through E can be used to represent various standards for each job function or skill for each job level.

Depicted in matrix form, a single picture of departmental standards is produced for typical job functions (see chart page 61). A matrix for job skills would be identical in style; the list of skills would replace the list of functions forming the vertical axis of the matrix.

The definition part of the process is now complete. Specific job functions have been identified for each job position, as have the skills that are necessary to fulfill assignments. The results can be distributed to the work force, laying the groundwork for the next step — formally evaluating individual performance.

Step 6: Evaluate actual performance. In rating individual performance, a third tool is used to make the evaluation meaningful and reduce the influence of subjectivity. This tool is a common scale that expresses the degree to which established standards have been met over the course of the evaluation period.

Such a scale retains uniformity regardless of how standards are expressed for each area, focusing attention on the question, "Did you do what you were expected to do?" It also takes into account the fact that different levels of performance are expected of different job positions. The following is an example of such a rating scale:

5 — Always exceeds standard.
4 — Frequently exceeds standard.
3 — Always meets standard.
2 — Usually meets standard but needs improvement in one or more areas.
1 — Occasionally meets standard.
0 — Never meets standard.

Each individual is evaluated according to the functions and skills specific to the position. Using this scale as an example, a rating of 3 denotes that the individual is performing at the expected level. Individual strengths and weaknesses as well as potentially underused skills can be monitored to provide information for needed training or controls.

If desired, weights can be applied to any or all of the rating areas to reflect the relative importance of the area. This is also useful in computing a weighted average to determine an individual's overall score. Since scores are all based upon a common scale of achievement, it is then possible to develop a forced ranking of all individuals in a given group or set of groups. This forced ranking highlights the overachievers as well as the underachievers and can be a factor in determining the distribution of annual salary increases.

Regular performance evaluation reviews benefit both employees and management by structuring and thus enhancing performance management. Many DP organizations seem to approach performance evaluations with all the enthusiasm of impending root canal work. This is understandable, since in many cases evaluation takes a backseat to keeping operations functioning and users happy. Without a meaningful structure to set standards and rate accomplishments, the process consists of the rating manager forming an opinion of an employee's work and then struggling to find the best way to express those feelings in writing.

By basing evaluations on published, quantified standards that express expectations for job function and skill abilities, a solid foundation is established for effective long-term human resource management in DP departments. The steps outlined earlier make it feasible to do so. First, specific job functions are identified, as are the skills necessary for successful performance of those functions. Next, progressive levels of ability and skill are defined, followed by the setting of performance standards for each position. When it comes time to evaluate actual performance, the measure is the degree to which those standards have been met. The process works, and it can work for you. ■

In Depth

Automating Glitter Gulch

Las Vegas DP managers must play it safe

Profiles of DP managers in five major Vegas hotels show familiar concerns: disaster recovery, inventory control and near-zero downtime. Yet their data bases track jackpots, high rollers and last-minute Superbowl betting.

By COLIN MCKINLAY

Data processing managers in the desert resort of Las Vegas, with its half-million permanent residents, operate their departments around the clock, the same as the facilities they serve operate, but little of the glamour of their business rubs off on their jobs.

Take, for example, Bill Watson, manager of the data processing operation at Bally's Grand Hotel, formerly MGM Grand. Watson calls himself "basically a systems man. I solve problems by devising a system that can be partially or completely computerized, depending on the need. We don't computerize for the sake of computerizing."

A 25-year veteran of the computer industry, Watson started out doing customer servicing at Bache & Co. of New York, moved on to Pan American Airlines, where he pioneered an on-line worldwide petroleum inventory system, and then took on inventory control at pharmaceutical maker Geigy Chemical Corp. From there, Watson moved to ABC, where he managed the processing of election returns, and then to Montefiore Hospital & Medical Center, where he developed an on-line customer billing system. He landed in Las Vegas via a job opportunity advertisement placed by MGM.

Watson manages an IBM 4341, an Electronic Engineering Co. Hotel Management System, an on-line race and sports book system using Data General Corp. equipment, a Datapoint Corp. telephone management system, an AT&T private branch exchange (PBX) running Integrated Hospital Network, Inc. software, and an IBM Series/1 that ties into the IBM 4341 to provide management with payroll and employee meal information.



PHOTO COURTESY OF LAS VEGAS NEWS BUREAU

Front office functions — including reservations, registration, city ledger accounts and files maintained on regular customers — are handled by the Electronic Engineering Hotel Management System. In the back office, the IBM 4341 is the workhorse, Watson says. It is there that all casino revenue accounting is done, along with the hotel and corporate general ledger and accounting functions.

Optical scanners for badges

The system also handles personnel functions: Bally's employees are issued badges that are inserted into an optical scanner as they report to work, and their attendance is automatically recorded on the Series/1. The badge is used similarly when eating at the employee cafeteria, since many employees, under the terms of union contracts, are entitled to one or two meals a day. When employees leave for the day, the badges go back into the machine for checkout.

The 4341 also maintains about 20 different kinds of mailing lists for the sales staff to use for soliciting new business for the hotel. Sales offices around the country are tied into the computer so that information about groups and conventions, as well as contracts and future commitments, can be kept current.

The DG hardware is used for the race and sports book system. It does accounting, prints betting tickets, manages payoffs and provides a daily summary.

The PBX Inquiry System, manufactured by AT&T, is tied into the Electronic Engineering system and provides a display board for telephone operators. An operator punches in as many letters as are necessary to get a display and room number for each guest. The system also is used to keep track of key employees when they are away from their desks.

In the way of change, Watson reports that a new payroll system is in the works; the payroll department currently does not have on-line access to the computer. Watson is also actively pursuing the development of an on-line purchasing and inventory control system to enhance his department's capability. "We are always looking to stay up to the minute in our

About the author
McKinlay is editor of the Las Vegas Business Press.



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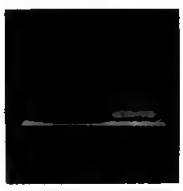
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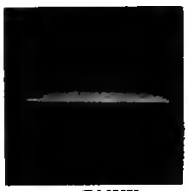


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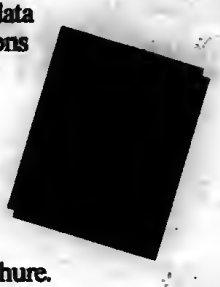
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In Depth/Las Vegas DP Managers

hardware. The state-of-the-art equipment is always under review," Watson says.

Also state of the art is a Johnson Controls JT80 fire control system with speakers in every guest room, a reaction to MGM Grand's tragic 1980



Bill Watson of Bally's Grand Hotel: "I'm basically a systems man."

fire that took scores of lives. Fire is one of Watson's major fears, although he says fire control procedures were drastically improved with the reconstruction of the hotel.

"You set your procedures to prevent a fire loss. You are always reviewing. You have dry runs to make sure that you can recover, but you never really know if it's going to work until it happens," he says.

The 1980 fire destroyed the hotel's computers, but the records sat in fireproof lockboxes and were undamaged. "We didn't miss a payroll after the fire," he reports.

There is one aspect of the business that is not discussed freely because of its sensitivity, but it is extremely important to the people who run the casinos. It is the "folio" kept on high-betting customers, and it determines how they will be rewarded when they check out of the host hotel.



Lyle Bell of Caesars Palace: "Our business never stops."

Their reward could be any combination of free room, food and beverages — identified in the industry as RF&B — depending on the amount of money spent at the tables. At many casinos using data processing equipment, financial transactions made during the stay of the guest are entered into a folio as they occur.

A casino executive then makes a determination as to the liability of the guest for charges incurred, which are usually assigned to the room. The decision by the casino executive often determines if the guest will come back or go somewhere else.

The folio contains personal information about the guest, such as his occupation, banker and established credit line. This information is carefully guarded by the casinos. The system was devised by the corporations when they took over the many casinos owned by partners — who carried folio information in their heads 20 years ago.

At Bally's Grand, Watson says, computers maintain two kinds of files on guests. The A file is for the regular guest, and the B file is for the preferred guest. "We even keep track of the birthdays or anniversaries of our better guests," Watsoo says.

□

At the 1,600-room Caesars Palace hotel, "the systems run 24 hours a day, because our business never stops," says Lyle Bell, director of data processing. "It is rare for us to have a system go down for more than 10 minutes. Our progamming and operations staff is committed to keeping these systems up."

Bell joined Caesars Palace in 1984, after four years as director of data processing for a manufacturing firm and eight years as a management information consultant with the accounting firm of Arthur Andersen & Co. in San Francisco.

Bell runs his department with two NCR Corp. 8550 mainframes, which are used for the front-desk system and for most of the accounting systems. This equipment, in use since 1976, is on the way out.

'Need to move ahead'

"It has served us well," Bell says, "but we need to move ahead with new technology. We need to transfer information on preferred guests into the casino information system on a more timely basis."

The department has used an IBM 4361 Model 4 since mid-1985, and that machine is now being used to bring up a new payroll/personnel system. New accounting software is destined for this machine in the future.

Caesars uses a Tandem Computers, Inc. Nonstop system for the race and sports book and for the casino information system.

"We need to replace our front-desk system, and we are looking at other possibilities. We have found that most front-desk systems are geared for hotels smaller than Caesars, so it will be a challenge to find something that will work for our size resort and can be integrated with our casino information system," he says.

Player incentive programs

Another system on the horizon would connect slot machines to a data collection and information processing base. This would give the hotel accounting and internal control information and provide an opportunity to market slot machine play through player incentive programs.

"For example," Bell says, "it is possible to issue a slot player a card to insert into the machine and accumulate points based on coins in and handle pulls. The boous points could be used to award the player prizes or other complimentaries."

Bell says another major application under construction is a casino accounting system that will be integrated with the casino information system. This system will automate fill and credit accounting at the tables and more efficiently prepare the "stiff sheet," which reports casino wins and related information by various areas in the casino.

Bell says there have not been any computer disasters at Caesars while he has been there, but that there were some anxious moments when the race and sports book system went down for a few minutes prior to a major football game — a critical time because of last-minute bets.

His secret nightmare would be a problem with the Tandem system on New Year's Eve or before the playing of the Super Bowl. This year, both events went off without a hitch.

Although it is a year or two away, Bell wants to provide the front-desk cashiers with point-of-sale information from the cash registers, "which most other places have."

□

"The whole idea is to keep the guest happy," says Jack L. Braman, director of management information systems for Hilton Nevada Corp., which includes the Las Vegas, Flamingo and Reno, Nev., Hiltons.

That process begins at Compass Computer Systems, a Hilton subsidiary, which maintains two IBM 3083s in Dallas to track Hilton



PHOTO COURTESY OF BALLY'S GRAND HOTEL

A 1980 fire destroyed the former MGM Grand's computers, but its records were safe in fireproof lock boxes. Says Watson: "We didn't miss a payroll."



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reservations on a worldwide basis. Braman takes over once the guest arrives with the help of an Ontel Corp. system consisting of 58 terminals and 29 printers located throughout the hotel.

The Hilton staff uses the system to take care of guests' needs while they are in the hotel, from check in to checkout. The system interfaces with point-of-sale devices — cash registers — and automatically tallies transactions charged to guest rooms, tacking them onto the customer's bill.

A Northern Telecom, Inc. telephone system automatically prices all phone calls and adds them to the guest's folio. The housekeeping department keeps track of the condition of the guest rooms through this system.

When a maid finishes cleaning a room, she picks up the phone, dials a number and reports that the room is ready for occupancy. This information goes to the computer and is available to the staff at the front desk for use in assigning the rooms.

> ***Bell says there have not been any computer disasters at Caesars while he has been there, but there were some anxious moments when the race and sports book system went down for a few minutes prior to a major football game — a critical time because of last-minute bets. His secret nightmare would be a problem with the Tandem system on New Year's Eve or before the playing of the Super Bowl.***

An IBM Series/1 Model 4956 handles the accounting system, the general ledger, accounts receivable, casino accounts, accounts payable and hotel and casino payroll using 12 terminals and five printers.

Soon Braman will provide hotel executives with daily profit-and-loss statements, an improvement over the current monthly statements produced by the system. "This system also talks to the corporate office in Beverly Hills, Calif.," Braman explains.

Slot machines are monitored by a Digital Equipment Corp. PDP-11/24, which tells the slot manager in hard-copy form how many coins were dropped in each machine, the number of coins paid out and how many times the handle was pulled. It also detects any mechanical failures and notifies the surveillance department monitoring the casino of any big jackpot.

Casino player history is maintained by an IBM System/38, which keeps track of receivables, accounting in the casino cage, the casino back-office accounting, disputes and all casino systems. It can display a guest signature on a screen to be viewed by hotel employees processing checks or markers. There are 55 terminals and 27 printers connected to the System/38.



PHOTO COURTESY OF HILTON NEVADA

Jack Braman of Hilton Nevada: "Keep the guest happy."

"This also helps us analyze a special event or the success of a junket," Braman says.

In April, the Hilton started to computerize its function book, which keeps track of special events such as conventions. IBM Personal Computers, of which the hotel already has bought 24 and expects to buy another 20 this year, represent part of an effort to increase department productivity.

First of many steps

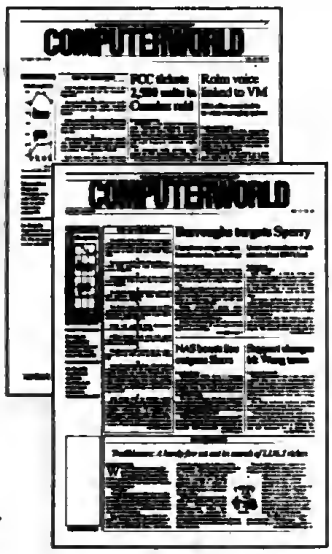
The function book is the first step in an attempt to give departments access to all function information, Braman says. Computerization of the engineering department functions is scheduled for this summer. The computer will keep track of trip tickets — work orders to make repairs — and will document time and costs for repair jobs.

According to Braman, the computers provide a cost forecast, establish preventive maintenance scheduled according to the manufacturer's recommendations and determine when something should be replaced rather than repaired. He adds that voice recognition is being studied as a possible replacement for keyboards and that inventory control is another area of interest.

Braman says he has no great fears about the system and can recall only one serious problem in the past 14 months. Three power surges blew out diodes late one evening, and the

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front-desk system was out of commission for an hour, but there were no guest complaints.

□

The data processing manager for the Union Plaza in downtown Las Vegas is Alan Dattge, who has held the position since October 1979.

A native of Las Vegas, Dattge worked for eight years in the accounting department at the El Cortez Hotel before joining the Union Plaza. The El Cortez management sent him to programming courses, and he picked up the rest of his expertise "piecemeal."

His equipment includes two IBM System/34s, one IBM System/36, a Tandem Nonstop II, a Remanco Systems, Inc. point-of-sale system for the hotel's Center Stage restaurant, about 70 CRTs around the hotel and 25 printers of various models.

The Remanco system provides a keyboard for a food server to enter a code number for a food order. For example, 525 might be a roast beef sandwich.

The order is printed out for the cook, and when the guest is finished eating, the system prints out the bill, breaking down the amount spent on food items, the bar and taxes.

"I am fighting for an inventory control system that will allow us to keep a better handle on our costs. As prices fluctuate, the system will automatically update the cost of menu items and let management decide how to structure its food. There is an IBM inventory and purchase order control system that does this automatically," Dattge says.

The System/36 "runs the hotel," with software from Pleasant Hill, Calif.-based Hotel Information Systems. Dattge says the software is used by more than 200 businesses around the world. The system handles reservations, check ins and checkouts, room availability, accounts receivable and commissions for travel agents.

Tracking gambling activity

The System/34 handles the gambling part of the hotel operation. It provides a game analysis and slot machine input. The daily drop is counted, as is the number of jackpots paid during a 24-hour period. Every seven days, a reading is taken of the slot activity. There is a meter reading of the number of coins put in the machine to produce a hold percentage.

For the table games, the machine keeps track of the drop for 21, craps and roulette on the basis of three shifts per day and calculates a drop-and-win percentage. There are daily totals, monthly totals and yearly totals — standard operating requirements of the Nevada Gaming Control Board, which polices the industry.

The Tandem Nonstop appears to be almost the standard of the race and sports betting industry. The Union Plaza's version gives each ticket writer his own computer terminal and allows information on eight tracks in the U.S. to be sorted out simultaneously for the players.

"All major sporting events can be handled," Dattge says. Every 24 hours, there is a series of management and auditing printouts. The computer prints the betting tickets, stores one copy and computes the winning prices, which are put on a display board manually.

The Union Plaza also has an automated attendance system, with the employee identification badge being used to check in and out of the time office. Dattge says

> ***Dattge has had no problems with the equipment, but half a dozen yearly power outages — usually when the wind blows — cause a few gray hairs, because "we don't have backup power here."***

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this gives management a daily labor cost for the profit-and-loss statement.

More than push buttons

Dattge says that the biggest problem is trying to get management to understand the capabilities of the computer. "They seem to think that all you have to do is push a button and out comes any kind of information. They don't realize that input is required. Too often, they think this is already done," Dattge says.

> ***"Management seems to think all you have to do is push a button and out comes information. They don't realize input is required. Too often they think this is already done."***
>
> — Alan Dattge, Union Plaza

The computer provides the labels for mail-out literature on eight yearly pan tournaments, six gin tournaments and, now, four slot machine tournaments. The hotel will have its own slot club, with the members being treated to parties, overnight stays and prizes.

Dattge operates his 24-hour department in a room with a 71° F controlled temperature — standard operating procedure — with a staff of six. Two people work days, one works a swing shift, one works the graveyard shift and two are scheduled for relief shifts.

He has had no equipment problems, but half a dozen yearly power outages — usually when the wind blows — cause a few gray hairs, because "we don't have backup power here." His backup system, begun in 1985, consists of microfiche files of everything that is computer generated.

□

Carole A. Carter, managing director of corporate computer services for Summa Corp., refers to the departments she works with as her "customers," because she feels that it is just as important for her to keep them happy as it is for them to keep the tourists happy.

At Summa, a company that was formed to manage the Las Vegas acquisitions of

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Union Plaza's Alan Dattge: Fighting for better inventory control.

the late Howard Hughes, Carter's customers include the Desert Inn, the Frontier, Sands, Castaways and Silver Slipper, all located in Las Vegas, and occasionally Harold's Club in Reno, Nev.

In addition, Carter's 75-member staff provides services for Summa's real estate division, which includes offices in Los Angeles, and Hughes Aviation Services, a fixed-base operation at McCarran International Airport that is the destination of many major airlines' charter flights to Las Vegas.

Carter worked her way up to her present position through seven years of service with Summa as an assistant controller at the Sands Hotel, as a member of the corporate computer services staff and as director of account control.

"We are a total IBM system," she says, and this system, like others in Las Vegas, operates 24 hours a day, seven days a week. The one exception comes when they shut it down for 90 minutes every Tuesday for maintenance.

The data processing department, which handles four million transactions a month, is located in its own building a block west of the Las Vegas Strip.

IBM shop

The system includes two IBM 4381 Model Group 2 CPUs; one IBM 4341 Model Group 2; 325 remote printers and terminals throughout the Summa empire; 105 local terminals in the data processing department; and seven IBM Series/1 minicomputers.

"We support our own casinos. In-house development and design for the hotel application was done by the department," she says.

The machines perform standard functions such as general ledger, with McCormack & Dodge Corp.'s general ledger accounts payable package, as well as capital projects, payroll, personnel and insurance for employees.

Carter's group created the software for the aircraft operation that keeps track of aircraft maintenance, parts inventory and accounts receivable, and it provides the same services for charter planes that major scheduled carriers provide — passenger seating, check in, a manifest and a video display screen that displays arrivals and departures throughout the Hughes terminal.

"We also have a business systems information center support group that is responsible for the acquisition and installation of microcomputers and subsequent training of all users," Carter says.

On the drawing board now are plans for a shift from a centralized to a distributed environment. When completed — within a few months — the system will include a mainframe connected to a minicomputer system that is specifically designed for a given department, as well as the addition of microcomputers to departments, Carter explains.

"With microcomputers connected to the mainframe, our customers can download selected information to their microcomputers. They can rearrange their data in the format they want to see printed out or add information for a whole new report," she says.

Cash register connection

A recent addition to the system is the connection of cash registers at the Frontier to provide instant point-of-sale data on guest purchases by hooking the NCR Corp. cash registers into the IBM mainframes.

"We are looking at another system for the Desert Inn," she says. "All we have to do is provide a communications link."

The only complaints registered come from guests who say the computer is too slow, particularly when they are standing in line waiting to be checked into rooms. "It's critical to have our computer work as fast as possible," Carter says.

Carter's overall philosophy, based on the fact that data processing work is charged back to users, is clear: "The customer is always right. I'm always available for their complaints, and I take their phone calls. We must provide the best service we can." ■

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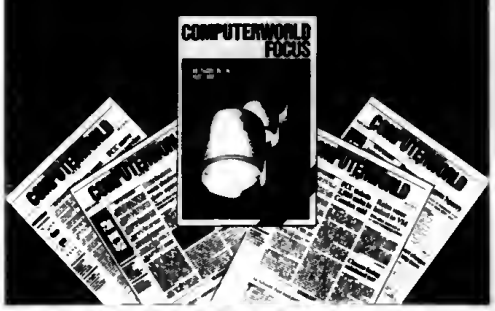
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MANAGEMENT

TAKING CHARGE
David R. Vincent

Making MIS a profit center

The profit motive is fundamental to our economy. It has been demonstrated over and over that when an activity cannot be related to profit, its management becomes vague and lacks clear business direction.

At its recent executive roundtables, The Information Group, Inc. found that most MIS executives operate as a nonprofit function and lack a cohesive framework in which to direct their department.

This situation can affect the careers of MIS managers. Their contributions are not always recognized because they are difficult to measure. Furthermore, the manager of a nonprofit function in a profit-oriented company is an enigma. Senior executives are reluctant to accept someone who plays by special and very hard-to-understand rules.

MIS must find a way to demonstrate its value or continue to be perceived as a noncritical factor in the business. There are many ways to demonstrate value, but the most convincing is return on investment.

Take, for example, the case of an MIS group at a utility company faced with the problem of measuring return on investment. The group was constantly under-funded. Its strategic importance was not clear and the perception of its value was minimal.

To begin correcting this situation, the group's head decided to let his department's end users directly bear the cost of information services.

See MAKING page 89

Vincent is president of The Information Group, Inc., a facility for research, executive education and consulting.

Data as competitive edge

Big Eight partner looks at shift in consultant approach

By Eddy Goldberg

The focus of MIS consulting has changed in recent years from applications development to the use of information technology to give businesses a competitive advantage, according to Joel Friedman, a partner in the Management Information Consulting Division of Arthur Andersen & Co.


Friedman

In a recent interview, Friedman discussed issues raised by the use of information for competitive advantage, a term that his firm has dubbed IFCA.

CW: Is the concept of IFCA appropriate for every company?

FRIEDMAN: I think it's probably [appropriate] for every organization. How formally you try to adopt the concept is going to vary with management style. I'll start with the premise that every organization would like to achieve a competitive advantage. Therefore, every organization has at least some opportunity to use information as a competitive weapon.

Some industries are far more amenable to the concept than others, and it depends on something we'll call information intensity. Every organization has some opportunity to use information as a competitive tool, but based on the nature of the industry and the markets they're in, you'll find varying degrees of success.

CW: Should executives be wary of competitive strategy hype?

FRIEDMAN Sure. Every five years or so, whether it's in the information systems arena or the business strategy arena, there is a new buzzword or matrix or technique. None of these things taken by themselves represent a panacea. There is

See DATA page 86

Information carries legal liabilities

By Donna Raimondi

In an increasingly litigious society, companies that sell computer-generated information or design are finding themselves in a vulnerable position. But, according to Peter Marx, a Boston lawyer who specializes in computer law, information managers can take steps to protect themselves.


Marx

Courts are starting to raise questions about who is responsible when incorrect information ultimately damages someone. The following examples are some of the cases in which judgment has already been reached:

- Families of the victims of a World Airways crash in Alaska collected $12 million in a lawsuit against Jeppesen and Co., a chartmaker, and the Federal Aviation Administration. The pilot of the ill-fated plane had relied on Jeppeson's allegedly inaccurate charts that portrayed instrument approach procedures — graphical drawings based on faulty government data.
- A federal appeals court in Boston ruled in May of this year that the U.S. Weather Service was not liable for an erroneous forecast that led to the deaths of four lobstermen.
- A researcher for Dun & Bradstreet Corp.'s on-line credit data base entered incorrect information about Greenmoss Builders, Inc., a contractor, that claimed the company had filed for bankruptcy.

Greenmoss sued Dun & Bradstreet for libel and sought damages for financial loss after the information was passed on to interested parties. Greenmoss won.

Answers to the question of who is legally responsible begin with principles of

See INFORMATION'S page 88

INSIDE

Calendar: Shows, conferences, seminars/82

INSTANT ANALYSIS

"With the trend toward the distributing and downsizing of computing, mini MIS groups will be established in each department. Central MIS will take on more of a consultative role."

— George Colony, president of Forrester Research, Inc.

Rise of end-user computing brings new challenge to MIS/DP

Data centers effective management tools

By Eddy Goldberg

The fact that end-user computing has arrived is irrefutable. Estimates show that by 1990, 80% of all computing will be conducted on end-user technology, according to the MIS Research Center at the University of Minnesota. But what end-user computing is and how its rapid growth should be managed are not as clear-cut.

"End-user computing is the unstructured use of computers by someone who is not a professional in data processing," according to Naomi Lee Bloom, a senior principal at American Management Systems, Inc. in Arlington, Va. "Management of end-user computing is the management of people doing unstructured things," Bloom adds.

This is not an easy mandate for MIS and DP departments accustomed to more centralized control. However, as microcomputer use in corporations continues to grow, it is a challenge with which MIS and DP managers must deal.

Implementing controls while still serving the needs of both the end-user community and the corporatewide information systems function can be tricky.

"Management has to be more or less formal and rigorous, depending on what's going on," Bloom says. "We equip everybody with micros and encourage their use. For some users there are no controls. But as end-user computing begins to take on the same role and authority traditionally handled by DP computing, it will need to have that same level of control," she asserts.

The Bank of New England in Boston has already installed seven personal computer local-area networks to serve its microcomputer users and is planning more.

"You walk a really fine line in managing end-user computing," says Danielle Barr, vice-president of corporate systems. "You have to have some control, but without stifling innovation absolutely. We institute only those controls that will help us keep moving forward." Barr cites standardizing software as one example.

She says end users are encouraged to work with the Information Center or the PC Coordination Center to develop new applications, but questions the need for users to become skilled programmers. Instead, she emphasizes the technical support and resources of the centers available to end users. "They get the idea, we develop it. They want the solution," Barr said.

This partnership is contributing to the greater scope of activities for information centers in general. "The PC management function is evolving, becoming more mature, a more ingrained part of the corporate environment," Barr says.

As a result, information centers that are only corporate "PC stores" are no longer viable, she says. Applications development tied into the needs of the corporation represents

See RISE page 84

TURNAROUND TIME

Larry Long

Q *Last year I chaired a committee that conducted an exhaustive search for a new computer system. Our recommendation, which appeared to offer the greatest price/performance, was accepted. The supermini computer selected offered close to 10 times the performance of our previous system.*

A year later we are still waiting for delivery of some peripherals, mainframe features and systems software that was promised five months ago. The local sales and technical support people are no help. The sales people can't fill out an order form properly and the technical field staff know less about the hardware and software than we do. We've gotten the runaround so many times that we now try to solve the problems ourselves.

It is apparent that we made the wrong decision, but now we are committed. What can we do?

Given that you're committed to this vendor, you must begin to work with the vendor to resolve current problems and avoid future problems. No computer vendor wants this kind of customer dissatisfaction.

If the right person were to learn of your problems, the firm might very well take action to rectify the situation.

If you are convinced that you will not get satisfaction from the local office, write a letter to the national sales manager. Document every instance in which you feel the vendor has acted unprofessionally or failed to live up to stated, written or implied agreements.

Such a letter will probably strain your relationship with the staff at the local office, but so be it. You will either be serviced properly by the existing staff members or by their replacements.

Q *The phrase "by the book" was coined to describe the man I work for: Be at your desk by 8:30 in the morning; take no more than one hour for lunch; and above all, don't make waves. I've worked as a programmer-analyst for the last four years and until recently I have enjoyed plenty of creative license. Now the differences in the way I work and the way my new supervisor wants me to work have resulted in a major personality clash. We don't like each other.*

I continue to work hard and I get a steady stream of positive feedback — except from him. During a recent performance review, he rated me "poor" in five of the six performance categories. His supporting statements were laughable.

I would like to stay with this company for a while, but this review may have destroyed my future with the company. Should I contest his evaluation of my performance?

If you feel that you have been wronged and that you can build a solid case for a stronger performance review, by all means use the formal grievance channels to contest the results of your review.

No performance evaluation system can factor out a rating supervisor's personal bias against a subordinate. That is why most systems have checks and balances, one of which is that your supervisor's manager has to sign off on your evaluation. Typically this signature is a rubber stamp, except when the evaluation is contested.

If your current evaluation is grossly out of line with previous evaluations and you can document the quality and quantity of your recent work, you stand a good chance of having your ratings adjusted.

Over the long term, if you expect to stay with the company, the two of you will need to negotiate a working arrangement. This will involve some compromise on both parts.

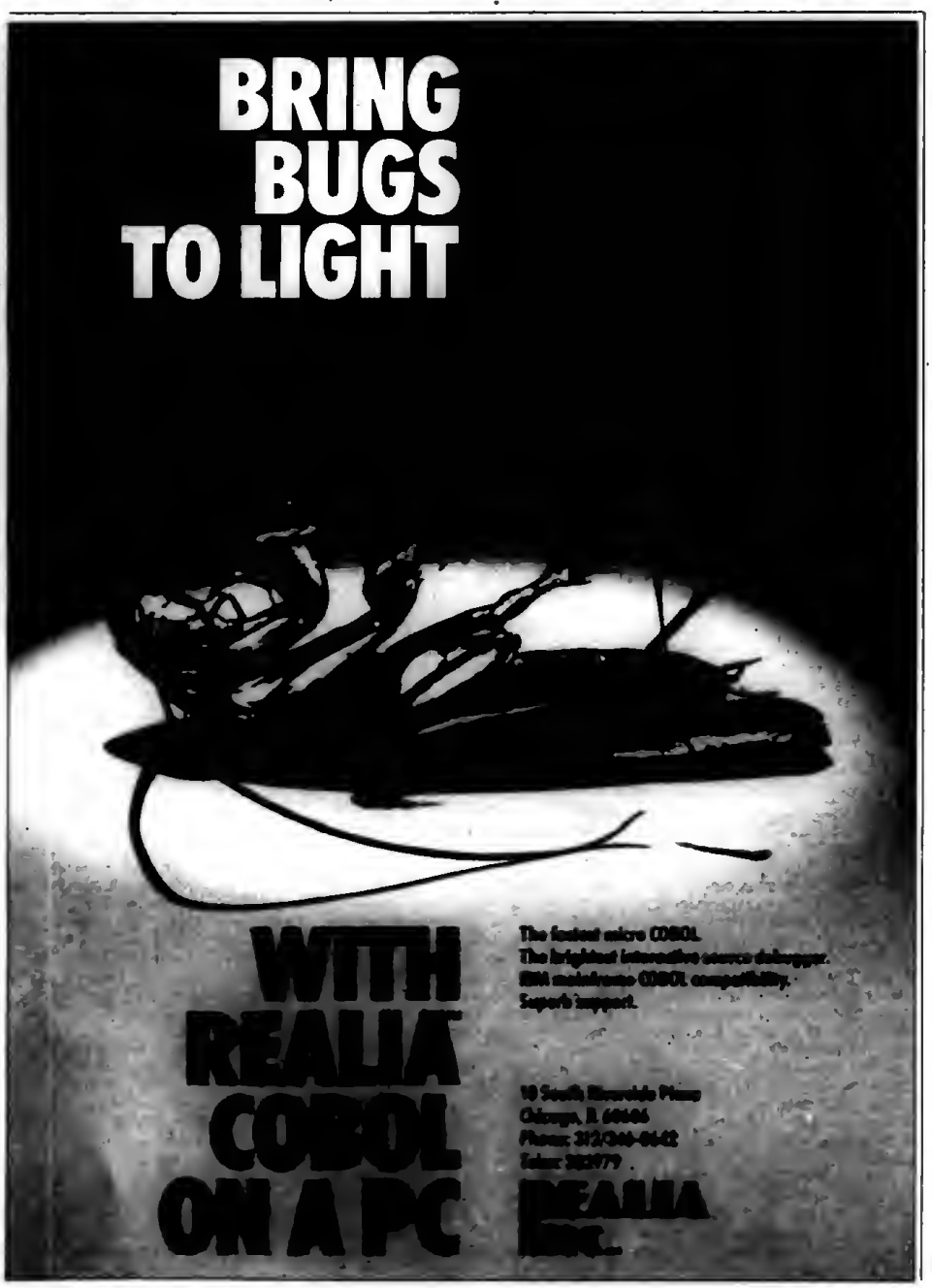
Q *We have eight personal computers in our public relations office, all of which are IBM Personal Computers or compatibles. Two of us set up the PCs, then trained ourselves and the others to use word processing, data base and spreadsheet software. We make good use of our personal computers, but we're certainly not sophisticated users.*

We would like to network our personal computers so that we can share files, programs, data and a laser printer. Our data processing people are mainframe-oriented and have no experience in micro networking. Moreover, they show very little interest in helping us, even if we pay their internal fee of $25 an hour. Do you think networking these PCs together would be too difficult a task for us to undertake?

"Difficult" is a relative term. More than one seasoned MIS professional has taken up primal scream while installing a PC network. If your knowledge is limited to a few DOS commands, then you may be in for a hard time. I don't mean to imply that you can't learn, but learning the specifics of PC networking poses a greater challenge than learning to use micro productivity software.

Before undertaking this task, I would suggest that you find a resource person to help you over the rough spots. Don't depend on any "free" help from the people who sell you the hardware and software.

Long, president of Long and Associates, is a consultant, lecturer and author in the field of information services. If you have a question you'd like him to address, send it to Larry Long, Editorial Department, Computerworld, P.O. Box 9171, Framingham, Mass. 01701-9171.



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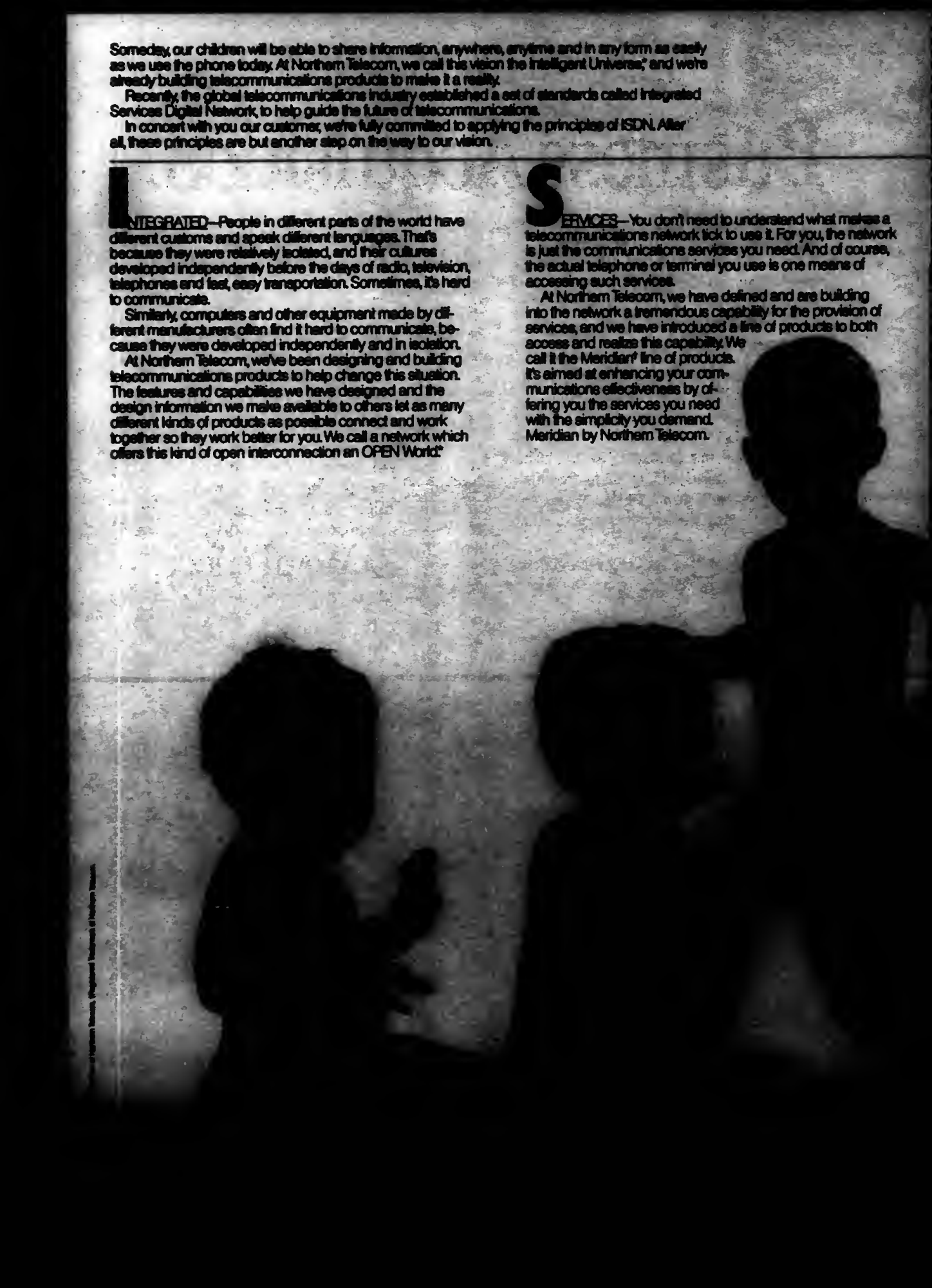
INTEGRATED—People in different parts of the world have different customs and speak different languages. That's because they were relatively isolated, and their cultures developed independently before the days of radio, television, telephones and fast, easy transportation. Sometimes, it's hard to communicate.

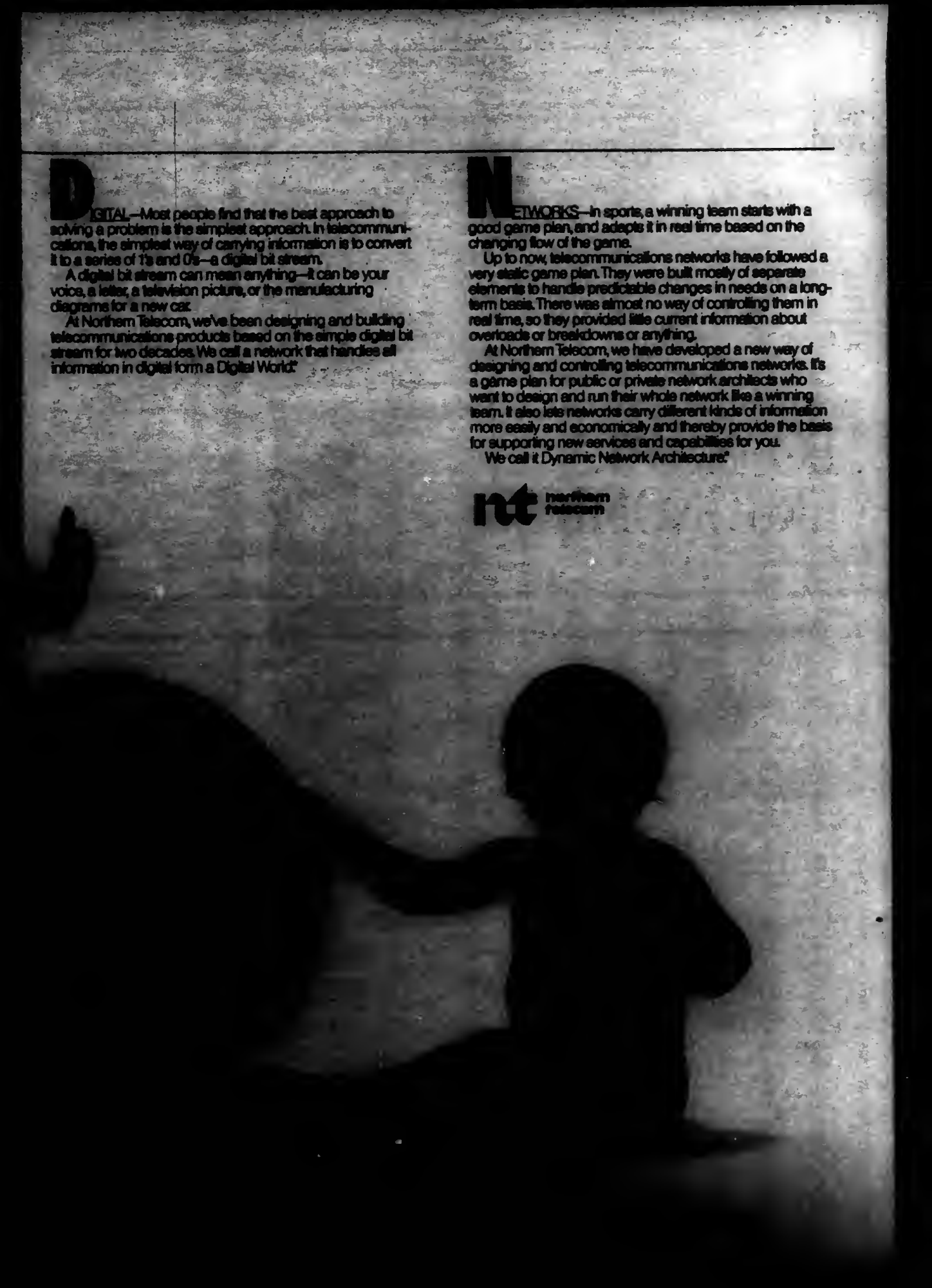
Similarly, computers and other equipment made by different manufacturers often find it hard to communicate, because they were developed independently and in isolation.

At Northern Telecom, we've been designing and building telecommunications products to help change this situation. The features and capabilities we have designed and the design information we make available to others let as many different kinds of products as possible connect and work together so they work better for you. We call a network which offers this kind of open interconnection an OPEN World.*

SERVICES—You don't need to understand what makes a telecommunications network tick to use it. For you, the network is just the communications services you need. And of course, the actual telephone or terminal you use is one means of accessing such services.

At Northern Telecom, we have defined and are building into the network a tremendous capability for the provision of services, and we have introduced a line of products to both access and realize this capability. We call it the Meridian* line of products. It's aimed at enhancing your communications effectiveness by offering you the services you need with the simplicity you demand. Meridian by Northern Telecom.





DIGITAL—Most people find that the best approach to solving a problem is the simplest approach. In telecommunications, the simplest way of carrying information is to convert it to a series of 1's and 0's—a digital bit stream.

A digital bit stream can mean anything—it can be your voice, a letter, a television picture, or the manufacturing diagrams for a new car.

At Northern Telecom, we've been designing and building telecommunications products based on the simple digital bit stream for two decades. We call a network that handles all information in digital form a Digital World.™

NETWORKS—In sports, a winning team starts with a good game plan, and adapts it in real time based on the changing flow of the game.

Up to now, telecommunications networks have followed a very static game plan. They were built mostly of separate elements to handle predictable changes in needs on a long-term basis. There was almost no way of controlling them in real time, so they provided little current information about overloads or breakdowns or anything.

At Northern Telecom, we have developed a new way of designing and controlling telecommunications networks. It's a game plan for public or private network architects who want to design and run their whole network like a winning team. It also lets networks carry different kinds of information more easily and economically and thereby provide the basis for supporting new services and capabilities for you.

We call it Dynamic Network Architecture.™

nt northern telecom

CALENDAR

JULY 20-26

JULY 20-23, TORONTO — **Directions at Toronto.** Contact: Cincom Systems, Inc., 2300 Montana Ave., Cincinnati, Ohio 45211.

JULY 21-22, SAN JOSE, CALIF. — **Computer-Aided Logistics Support.** Contact: Education Foundation of the Data Processing Management Association Seminars, Dept. CALS, P.O. Box 3608, 3420 Kashiwa St., Torrance, Calif. 90510. Also being held July 24-25 in Los Angeles.

JULY 23-25, BOSTON — **Microtrends '86, Education: Redirecting the Revolution.** Contact: Bobbi Hunt, International Communications Industries Association, 3150 Spring St., Fairfax, Va. 22031.

JULY 23-25, MORRISTOWN, N.J. — **Data Communications: Fundamentals and Beyond.** Contact: The American Institute, Carnegie Building, 55 Main St., Madison, N.J. 07940. Also being held July 30 to August 1 in Los Angeles; August 6-8 in Anchorage, Alaska; August 13-15 in Boston; and August 20-22 in Indianapolis.

JULY 24-25, ATLANTIC CITY — **Integrated Logistics Support.** Contact: TTS Seminars, c/o Technology Training Corp., Dept. ILS/LSA, P.O. Box 3608, 3420 Kashiwa St., Torrance, Calif. 90510. Also being held July 28-29 in Orlando, Fla., and July 31 to August 1 in Washington, D.C.

JULY 24-25, SAN FRANCISCO — **Advanced Communications Architectures Seminar.** Contact: Communications Solutions, Inc., 992 S. Saratoga-Sunnyvale Road, San Jose, Calif. 95129. Also being held August 19-20 in Washington, D.C.

JULY 24-25, WASHINGTON, D.C. — **EDI Training Session.** Contact: TDCC, 1101 17th St. N.W., Washington, D.C. 20036. Also being held August 21-22 and September 25-26 in Arlington, Va.

JULY 27 TO AUG. 2

JULY 27-30, BOSTON — **Recognition Technologies Users Association Forum '86 Summer Session.** Contact: Recognition Technologies Users Association, P.O. Box 2016, Manchester Center, Vt. 05255.

JULY 27-31, ANAHEIM, CALIF. — **Third Annual Information Center Conference & Exposition.** Contact: Information Center Conference & Exposition, Weingarten Publications, Inc., 38 Chauncy St., Boston, Mass. 02111.

JULY 28-29, AVON, COLO. — **How to Manage Data and Information as a Resource.** Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

JULY 28-29, BOSTON — **Fast Algorithms Seminar.** Contact: Technology Training Corp. Seminars, Dept. FA, P.O. Box 3608, 3420 Kashiwa St., Torrance, Calif. 90510. Also being held July 31 to August 1 in Orlando, Fla., and August 4-5 in Washington, D.C.

JULY 28-30, RENO, NEV. — **1986 Summer Computer Simulation Conference.** Contact: The Society for Computer Simulation, P.O. Box 17900, San Diego, Calif. 92117.

JULY 28-AUGUST 1, SAN DIEGO — **Mapper Installation, Coordination and Support.** Contact: Computetrics Training Institute, P.O. Box 58383, Houston, Texas 77258.

JULY 28-AUGUST 1, SEATTLE — **Omnicom Week.** Contact: The Omnicom Institute, Omnicom, Inc., Suite 304, 501 Church St. N.E., Vienna, Va. 22180.

JULY 30-AUGUST 1, AVON, COLO. — **How to Build and Use a Data and Information Resource Directory.** Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

AUG. 3-9

AUGUST 4-8, ANN ARBOR, MICH. — **Contemporary Data Communication Networks: Planning, Management and Computer-Based Design.** Contact: Engineering Summer Conferences, 300 Chrysler Center/N. Campus, Ann Arbor, Mich. 48109.

AUGUST 4-8, FORT COLLINS, COLO. — **Topics in Manufacturing Systems Engineering.** Contact: National Technological University, P.O. Box 700, 601 S. Howes St., Fort Collins, Colo. 80522.

AUG. 10-16

AUGUST 11-14, SNOWMASS, COLO. — **AM/FM International Ninth Annual Conference.** Contact: AM/FM International, Suite 820, 8775 E. Orchard Road, Englewood, Colo. 80111.

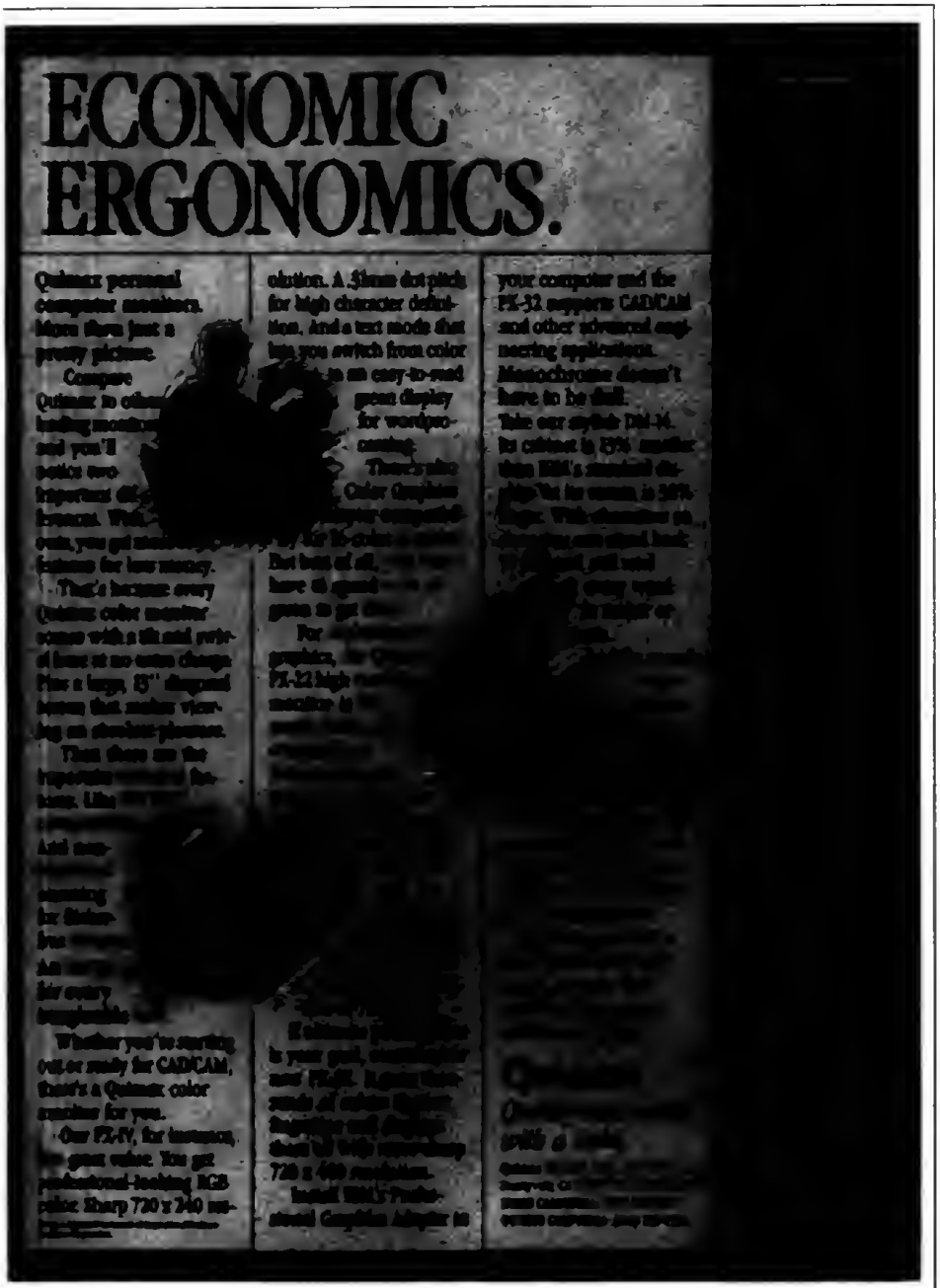
AUGUST 11-15, PHILADELPHIA — **AAAI-86 Fifth National Conference on Artificial Intelligence.** Contact: AAAI-86, The American Association for Artificial Intelligence, 445 Burgess Drive, Menlo Park, Calif. 94025.

AUGUST 14, ATLANTA — **Buying and Selling Rights to Software, Hardware and Services.** Contact: Data-Tech Institute, Lakeview Plaza, P.O. Box 2429, Clifton, N.J. 07015. Also being held August 15 in Philadelphia, August 18 in Boston and August 19 in Chicago.

AUG. 17-23

AUGUST 18-22, DALLAS — **Thirteenth Annual Conference on Computer Graphics and Interactive Techniques.** Contact: SIGGRAPH '86, Conference Management, Smith,

See CALENDAR page 84



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[illegible] we make it [illegible]

Rise of end users brings challenge

From page 77

the future.

W. H. Groetzinger, director of Information Systems and Management Services at Rohm and Haas Co. in Philadelphia, says, "We're enthusiastic about end-user computing and doing what we can to support it. Employees are provided with a pretty full set of end-user tools at the mainframe, System/36 and PC levels."

Groetzinger uses the four classic stages of growth — initiation, proliferation, control and maturity — to describe the growth of end-user computing at his firm. Rohm and Haas, he says, is now in the control phase.

"We don't think you can put requirements on what you permit people to do," he claims.

However, he is instituting a level of control by restricting the types of personal computers and software his group is willing to support.

Doug Norwood, manager of the Information Center for the City of Los Angeles, sees three trends from his end-users: increased demand for micro-to-mainframe links, with the host used as a library; higher demand for graphics and associated printers; and more use of host-based products such as SAS, from SAS Institute, Inc., and Focus from Information Builders, Inc., which have risen fourfold in the past year.

> ***'Six to nine months ago, everyone was happy with standalone Lotus 1-2-3 on PCs. Now they want data from the mainframe, to download, to transfer to other PCs and to other sites,'***
>
> — Kathy Kilduff
> Honeywell, Inc.

Norwood's staff of seven serves a user community of about 1,500, of whom 1,000 have user IDs, and he receives many requests for new packages. However, he says caution is the key word when dealing with enthusiastic users hot for a new product. He suggests sticking with a basic set of PC software products: word processor, spreadsheet, data base and graphics.

"Unless you have a quantum leap in the technology, if it has a little more whiz-bang, it won't be substantially better. There are a lot of look-alike products," he warns. "There's so much software out there to keep up with."

Yet he finds most of it is for micros. "We're not finding a great deal of advanced technology for data bases or spreadsheets on the host."

Each organization's end users have their own individual and collective life cycles. As their needs continue to evolve, end users become more sophisticated and demand more from the information center.

"Six to nine months ago, everyone was happy with standalone Lotus 1-2-3 on PCs. Now they want data from the mainframe, to download, to transfer to other PCs and to other sites," says Kathy Kilduff, manager of Honeywell, Inc.'s Information Technology Center in Waltham, Mass.

After installation and initial education, Kilduff's biggest problem is communications, linking the standalones.

One part of her solution is to write her own communications course for the end users. Education is a large part of what she does in the information center, but she says staying abreast of changing user needs is critical.

"What worked last year won't necessarily work this year. We're refining our courses every quarter," Kilduff says. She finds users requesting increasingly advanced courses.

In order to sort out the plethora of microcomputer products, Kilduff is part of Honeywell's PC Council, which has an internal, nationwide software data base. She said the group has corporately licensed training tutorials for the most popular packages.

She also uses the services of Corporate Software, Inc. of Canton, Mass., which researches thousands of software packages each year and puts the top 400 in a reference book that information center managers can use to assist them in choosing the software most appropriate to their needs.

Information centers

Information centers appear to be an effective method for MIS departments to manage end-user computing.

"A good responsive information center is the logical response to end-user computing," says James C. Wetherbe, a professor of MIS at the University of Minnesota and director of its MIS Research Center.

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Bucklin & Associates, Inc., 111 E. Wacker Drive, Chicago, Ill. 60601.

AUGUST 18-22, WALTHAM, MASS. — **The Institute on Artificial Intelligence and Expert Systems.** Contact: Joan Merrick, Seminar Coordination Office, Suite 415, 850 Boylston St., Chestnut Hill, Mass. 02167. Also being held September 29-October 3 in Chicago.

AUGUST 19-20, NEW YORK — **DEC: The Next Five Years. Contact:** The Yankee Group, Seminar Division, 14th Floor, 89 Broad St., Boston, Mass. 02110.

AUGUST 19-21, PHILADELPHIA — **Second Annual Physical and Electronic Security Symposium and Exposition.** Contact: Michael C. Otten, Booz, Allen and Hamilton, Inc., 4330 East-West Highway, Bethesda, Md. 20814.

AUG. 24-30

AUGUST 24-28, SAN FRANCISCO — **The Third International Congress on Advances in Non-Impact Printing Technologies.** Contact: Society of Photographic Scientists and Engineers, 7003 Kilworth Lane, Springfield, Va. 22151.

AUGUST 26-28, SAN MATEO, CALIF. — Interconnect '86. Contact: Agnes M. Pavel, Program Director, U.S. Telecommunications Suppliers Association, Suite 1618, 333 N. Michigan Ave., Chicago, Ill. 60601.

AUGUST 27-29, NOORDWIJKERHOUT, THE NETHERLANDS — Information Systems Assessment. Contact: Stichting Informatica Congressen, Paulus Potterstraat 40, 1071 DB Amsterdam, The Netherlands.

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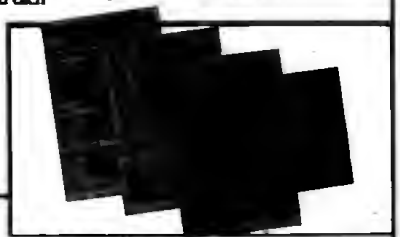
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Australian Macworld is Australia's magazine for the Macintosh user community. It is published bi-monthly and has a circulation of 12,000.

Communications World is CW's newest publication reaching the Australian market. This bi-monthly publication covers telecommunications, office communications and network management, and has a circulation of 10,000.

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Data use gives competitive edge

From page 77

no magic inherent in any of these techniques that will assure success. They are basically one more means by which an organization can refine its planning process, refine its operations and try to beat the competition.

IFCA shouldn't be overblown in terms of its importance. It's just one more tool in the bag of tricks that any information systems manager has to better discharge his responsibilities.

CW: Who might initiate IFCA, and how should it be justified?

FRIEDMAN: There are really several starting points. Again, it varies with organizational style. Where it has been most successful is where it has been driven by the executive office in conjunction with the business strategy or the equivalent of the chief information officer in conjunction with long-range information planning.

Those two starting points tend to take a fairly broad view of the company, its markets and its competition. Rather than starting with the notion that we have some neat technology and how should we use it, it's the other way around: We've got a business problem to solve, and what can we do with the technology to better enhance our position?

CW: What are the major obstacles that crop up in the implementation of these programs and projects?

FRIEDMAN: There are several. Just as all business strategies are not going to be successful, not all information technology strategies are going to be successful. You have to overcome the unrealistic expectations of management that technology is somehow magical and that everything is going to be dramatically successful.

The second issue is technology, particularly when building competitive intelligence systems, for example. The success of those depends on the availability and accuracy of the information you're going to obtain. There are limitations on the data itself, the retrieval and the data base capabilities within the organization.

The third problem, particularly with the internal use of information for competitive advantage . . . is that once you build those [competitive intelligence systems] and make information available to the executive suite on a timely basis, you have now dramatically shifted the balance of power within the organization. Once you provide information on-line to the executive suite, you've shifted power. The middle management ranks in the organization can find that extremely threatening if it isn't managed properly.

CW: What can the MIS manager do to bridge the gap to the executive office?

FRIEDMAN: It's all driven by the ability to use information to solve business problems. If the approach from the information systems manager to the executive suite is to say, "Gee, I have this really neat hardware, and here's what we can do with it," and you happen to have an executive who's not attuned to hardware, it will fall on deaf ears.

If the information systems manager takes the perspective, "We're using this resource to help with our business goals and strategies, and we're focusing on the needs of all of your users in the organization," you may or may not get the CEO to buy into the system, but you can typically find a number of user sponsors for more advanced uses in technology.

> ***'If a competitor is able to use technology as a competitive weapon and you don't respond . . . you'll be held accountable to your shareholders sooner or later.'***
>
> — Joel Friedman
> Arthur Andersen & Co.

CW: What about MIS managers today, some of whom may not want to get involved in the strategic aspects of information technology?

FRIEDMAN: The trauma of change. That's true with any kind of change, whether it's technology, product or marketplace. Yet if an organization doesn't respond to change, it's not going to survive. I think organizations will find themselves with very little choice.

If a competitor is able to use technology as a competitive weapon and you don't respond . . . you'll be held accountable to your shareholders sooner or later. If you're the individual who doesn't respond and you have a whole level of management beneath you that does understand better how to use technology, you'll become superfluous.

You've got to face up to change. There really is no choice. It's a question of how rapidly you do it, how rapidly your industry is changing, how rapidly your competitors are changing. But you have no choice.

So for the information systems manager who's finding himself frustrated today, there are a couple of messages. One is to keep the faith, because change is inevitable. Two is to find a coalition of supporters within the organization because there are going to be individuals in the organization who really see the use of technology and information and the competitive potential. I'm very optimistic about this change.

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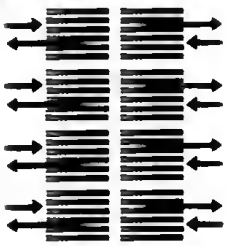
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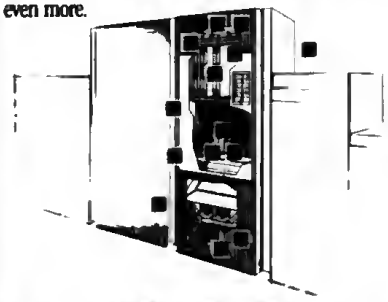


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TANDEM COMPUTERS

Information's liabilities

From page 77

common law, according to Marx, a partner in the Goulston & Storrs law firm in Boston. "You start from a basic premise of Anglo-American law that people are responsible for their wrongs to others if they have some kind of a 'duty of care' toward them," Marx says. But what constitutes duty of care is not clear-cut.

For example, a company that claims to sell a word processing program has a duty of care to provide that product. If the program actually is not a word processor but only a text editor, the customers who bought the package expecting word processing services could win a lawsuit, because they clearly ended up with something other than what they expected.

The vendor is under legal obligation to provide what it says it provides — in this case, word processing software.

On the other hand, nobody can hold the U.S. Weather Service responsible for ruining their picnic if the service said it would be a sunny day and it rains, Marx says.

"If I was going to be a guest at your picnic, which you planned on the weather service forecast, and it rained, and I sued, I would not win," he explains. "That is clearly so removed there is no duty of care."

Shades of gray

But between those two extremes are many gray areas, Marx says. Often, informational services are mislabeled as products, a legal technicality that can make a world of difference, Marx says.

"Traditionally with services, you had to have been negligent in order to be held liable," he says. With products, there is strict liability, whether or not the provider was negligent.

However, marketing departments often package services as a product so that the customer thinks he is getting something tangible, he adds.

Steps that smart managers can take to reduce chances of being held responsible start with an awareness of how the service they provide is being marketed, Marx says. Managers should ensure that the capabilities of the service or product are not being exaggerated.

In addition, managers should think about the effects of their service or product on third parties as well as on the direct customer. This is particularly true when lives or large sums of money are involved, Marx says.

Quality control is important, Marx says. "If the data you are dealing with may have serious consequences — such as the data used in disease control or aircraft control — there should be redundancies."

Two clerks could separately enter critical information and if discrepancies result, a supervisor should check the data to see why it is different.

Companies should sign contracts with suppliers and customers to shift responsibility wherever possible, Marx continues. "Jeppeson could have had a contract with the aircraft owner saying the owner was responsible for whatever happened to the plane."

At the time of the World Airways disaster, it was not possible for a company to sign such a contract with government agencies. But Jeppeson later helped push legislation through Congress so that now a company can contract to shift responsibility for mistakes that are solely the government's fault.

"When important decisions are made, they should be recorded," Marx says. Internal records should be complete, documenting all the considerations that went into deciding whether a product or service was safe.

Records should cite all efforts that were made to ensure safety and to improve the service or product, so that if there is a lawsuit, there is a formal record of company responsibility and not a lot of "smoking guns" — informal memos that work against the company.

The information manager should know how the company's insurance policies protect himself and his staff. "How much do the insurance companies cover MIS activities? Do they cover MIS executives personally?," Marx asks. If there is a duty of care that extends to individual employee's responsibility, it might be wise to have that employee well covered.

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You'll be light years ahead in data communications with a Siecor fiber optic star system for your LAN. Because, our Ethernet-compatible star system stems from extensive fiber optic experience. We've designed and made hundreds of reliable fiber optic products. And pioneered many significant advancements.

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Making MIS a profit center

From page 77

The group first researched prevailing market rates of outside service bureaus. They then consolidated the quotes and averaged them. From the averaged rates, they subtracted 25% to arrive at a rate far below market value.

The new rates were proposed to management for use in evaluating the distribution and effectiveness of MIS resources. When management agreed the proposed rates were more than fair and should be used, the MIS group created a competitive revenue stream for funding its operations.

The group then had to determine how much of the revenue should be invested in MIS. It also had to determine how much should be returned to the corporation.

It created a profit-and-loss plan and statement of assets. Management agreed to achieve the same return on its MIS assets as on others. The target return, when subtracted from the revenue, yielded the MIS budget.

The user departments thus absorbed charges from MIS as expenses in their operations. Each user matched his portion of MIS expenses to his ability to generate revenue or to control costs. Essentially, investment judgments in MIS were passed on to users.

This process is analogous to transfer price mechanisms used in large manufacturing organizations, which measure performance at each plant contributing to the end product. Likewise, data processing and information services are two of many corporate resources used to produce an end product.

At the utility company, top management changed its perception of the MIS department. Rather than a drag on overhead, it was seen as a vital contributor to the company's earnings. The MIS executive gained stature and became more involved in business decisions.

Nevertheless, there are pitfalls in establishing MIS as a profit center. If objectives are not well defined, the concept might lead to disastrous results. Profit-oriented MIS and user managers might squeeze out vital services such as security and disaster recovery as a result of short-term profit maximizing. The corporation might have to fund any MIS activity that doesn't have short-term benefits to users.

Profit centers favor high-volume, complex applications such as on-line systems. These are used by a limited number of business groups and generate very profitable revenue. On the other hand, applications such as time-sharing are less complex, use fewer resources, and are far less profitable.

Time-sharing may use large amounts of MIS resources, but this is spread over many users. When a profit-oriented MIS group favors more profitable transactions, service may suffer for others, even though that is at odds with business objectives.

The solution to matching service to business objectives lies in changing the way MIS professionals are paid and rewarded.

Motivation obstacles

At an Information Group executive roundtable, MIS managers complained about personnel departments and restrictive salary systems, such as the odious Hay Point program, because these systems create obstacles to motivation.

When MIS professionals are paid and rewarded under obsolete and bureaucratic systems, there is little hope for aligning them with business objectives. Executives at the roundtable felt that in addition to changing the method of assessing MIS performance, jobs and reward systems should be restructured.

That is easier when they can be based on an identifiable MIS contribution such as return on investment.

Finally, MIS executives in charge of a profit center need to be involved in the business of the organization more than ever to optimize the results of the new MIS business unit.

If the profit center views itself as an independent business, it might turn away from day-to-day involvement with the organization it serves. Running an MIS unit as a profit center should enhance its stature in the organization, not alienate it.

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NEW PRODUCTS

Page reader eliminates rekey need

Compuscan, Inc., of Fairfield, N.J., has introduced the PCS Model 235 personal computer-compatible page reader.

According to the vendor, the PCS Model 235 eliminates the need to rekey information contained in correspondence, reports and files.

It is said to be able to scan a typewritten page of text or data and input the information, properly formatted, into IBM Personal Computers and compatibles in 30 sec. or less.

Automatic features

Priced at $3,150, the page reader is said to automatically stack-feed up to 50 pages while unattended, read popular office type styles and automatically add proper formatting codes.

It also comes with an interface for most word processing software packages such as Micropro International Corp.'s Wordstar and Wordstar 2000, Ashton-Tate's Multimate, IBM Displaywrite, Samna Corp.'s Samna Word and Volkswriter Deluxe and Wordperfect Corp.'s Wordperfect.

According to a company spokesman, the PCS Model 235 supports word processing, data communications, document distribution, electronic mail, data base creation and electronic filing applications.

He added that the scanners were designed to solve the problem of bottlenecks caused by an increasing amount of paper-based information that, without the scanners, would need to be manually keyed into personal computers, word processors and other office systems.

The PCS Model 235 is Compuscan's second personal computer-compatible page reader.

The company's PCS Model 230, introduced last fall, costs $5,695. It has the same features as the PCS Model 235 with the added capability of being upgradeable to connect with dedicated word, communications and data processors.

The company also offers the Model 220 PCS Scanner that was designed to operate specifically with dedicated word processors such as those offered by Wang Laboratories, Inc. and IBM.

Desktop 9-track streaming drive boasts small footprint

A desktop 9-track streaming tape drive with a small computer systems interface (SCSI) has been released by the Qualstar Corp. of Canoga Park, Calif.

Called Ministreamer Model 1054, the tape transport is said to be IBM and American National Standards Institute (ANSI) compatible, using standard ½-in. tape on a 10½-in. reel. The Ministreamer is priced at $3,995.

With Ministreamer Model 1054, users can select densities of 1,600 and 3,200 bit/in. Tape streaming speeds are 50 and 25 in./sec., respectively.

According to Qualstar, one of the major advantages of the system is its small size. The drive measures 12¼ in. by 21½ in. by 8¼ in. It weighs 31 lb. and does not require a separate equipment rack for mounting.

The surface area required for the drive is said to be about the same as for an 8½-by 11-in. piece of paper.

The SCSI interface is said to simplify the software integration of various peripherals on a common bus.

The SCSI controller in each of the Ministreamer drives provides the system with the drive's parameters and makes it possible for one software driver to control a number of different peripherals.

Features microprocessor technology

According to a company spokesman, the Ministreamer features microprocessor technology designed to control tape motion and eliminate tension arms.

Qualstar manufactures and markets a family of ANSI- and IBM-compatible 9-track, streaming tape drives, including 7-in. and 10½-in. drives with Pertec Peripherals Corp./Cipher Data Products, Inc., IBM Personal Computer and SCSI interfaces.

The company also supplies a tape subsystem for the IBM Personal Computer XT and AT that allows the user to interchange data files with virtually any mainframe computer, the vendor said.

Tool enables RM/Fortran users to develop graphics applications

Ryan-McFarland Corp. of Rolling Hills, Calif., has announced that RM/Fortran IBM PC-DOS users can now develop graphics applications using Graphics Software Systems, Inc.'s GSS-CGI-based Graphics Development Toolkit.

According to the vendor, RM/Fortran programmers using the Graphics Development Toolkits's GSS-GCI raster technology can now develop applications featuring pop-up menus, windowing and high-quality text fonts.

GSS-GCI is said to be the first true device-independent computer graphics interface for raster and vector graphics.

RM/Fortran applications

It enables RM/Fortran applications to be decoupled from hardware dependencies and eliminates the need for applications developers to create device drivers of graphics algorithms.

The GSS Toolkit is said to support a wide range of I/O devices, such as the IBM Enhanced Graphics Adapter and other IBM peripherals, as well as devices from Hewlett-Packard Co., Epson America, Inc., Okidata Corp., Ricoh of America, Toshiba America, Inc., Hercules Computer Technology, Inc. and Mouse Systems Corp. systems.

Designed to support the migration of high-end Fortran applications, RM/Fortran is a complete implementation of the Fortran-77 standard, certified error-free by the General Services Administration at the highest possible level.

IBM markets RM/Fortran Version 1.0 as IBM PC Professional Fortran for its engineering and scientific series of machines, the vendor said.

The price of RM/Fortran is $595, and the price of the GSS Graphics Development Toolkit is $395

TRT interface lets VAX, IBM minis access telex network

Offers accountability, internal message ID

TRT Telecommunications Corp. of Washington, D.C., is offering telex interfaces for users of IBM System/34, 36 and 38 computers and Digital Equipment Corp. VAX minicomputers.

The telex interfaces for IBM System/34, 36 and 38 and VAX provide menu-driven access to the worldwide telex network and enable users to send messages to other private or public networks, using TRT as the gateway.

Access to TRT is available via a 1,200 bit/sec., 2,400 bit/sec. or 4.8K bit/sec. dial-up connection. The procedure of message processing on the interfaces consists of the user creating or revising his message with the telex editor, placing the message on the transmission file and letting the system automatically transmit the message.

According to TRT, full message accountability is ensured, either via a message log that is continually updated on the IBM System, or — with both the DEC VAX and the IBM System/34, 36, 38 — through a TRT acknowledgement number, delivery notice and message text at the sender's workstation or printer.

In addition, both systems are said to allow for the assignment of an internal message identifier, enabling users to keep separate files on messages by project name or by department.

Both TRT interfaces provide for outgoing message control and routing through a supervisor. Messages leaving the system are created and delivered to TRT for telex transmission from the user's workstation.

Messages coming into the system from domestic and international points are automatically distributed directly to the correct end user on the system.

The fully paid license for the interface, including system software and autodialer hardware and software, costs $4,500 for the IBM System/34 and 36 and $5,500 for the System/38. A maintenance option is available for $40 per month. For the DEC VAX, the permanent license costs $2,700.

A one-year license with option to convert is available on the IBM System/34 and 36 for $228 per month and on the System/38 for $269 per month, maintenance included.

According to a company spokesman, if the user wishes to convert from a one-year license, he can use 65% of payments already made as payment toward the new license

INSIDE

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SOFTWARE & SERVICES

Systems software

Cosmic has announced **Expert System Executive**, a computer program for use in automated real-time monitoring.

When provided with a set of rules and real-time data, the Executive continuously compares the current status to the rule conditions, determines which rules are applicable and performs the required action. It has three major data principles: an array containing the rules, an array containing the conditions and the queues containing the conflict set.

The program is written in C for use on a Hewlett-Packard Co. 9000 series computer.

Expert System Executive costs $500.

Cosmic, Computer Services Annex, The University of Georgia, Athens, Ga. 30602.

■

Genesys Software Systems, Inc. has enhanced its **Human Resource Managers and Staff** (HRMS) system software by including an English/French language capability.

The HRMS program includes Payroll Accounting, Personnel Administration and Benefits Management. Either French or English may be selected at logon, and all menus, data entry, data inquiry and system screens appear in that language. A user can switch between languages without having to sign on again.

HRMS runs on IBM mainframes under OS or DOS.

The enhancement costs from $32,000 to $65,000 for individual modules. The complete system costs from $111,000 to $355,000.

Genesys Software Systems, 20 Ballard Way, Lawrence, Mass. 01843.

■

Hewlett-Packard Co. has introduced its **HP 64000-UX** microprocessor development environment.

The product is said to provide connectivity and compatibility with host computer environments. It offers such capabilities as an open system with versatile networking to microprocessor software development environments such as Digital Equipment Corp. VAX and IBM Personal Computers, in-circuit emulators, and analysis tools for 8-, 16- and 32-bit microprocessors and HP computer-aided software engineering tools that address the entire microprocessor software design cycle.

HP 64000-UX costs $6,500.

HP, Inquiries Manager, 1820 Embarcadero Road, Palo Alto, Calif. 94303.

■

Convex Computer Corp. has announced that Quantitative Technology Corp.'s **Math Advantage Software** is now available for use with Convex's C-1 supercomputer system.

The Convex Math Advantage consists of 176 engineering and scientific subroutines. The subroutines are said to provide functions used in signal and seismic processing, mechanical design and scientific computing.

Convex Math Advantage costs $10,000 in executable form. The source code costs $15,000.

Convex Computer, 701 N. Plano Road, Richardson, Texas 75081.

■

IMSL has released the **IMSL Library** for Pyramid Series 900 systems using the Fortran 77 compiler, under the OS operating system.

The IMSL Library is said to provide over 500 mathematical and statistical Fortran subprograms for the professional problem solver. The IMSL library subroutines are divided into three categories: mathematical, statistical and general applications.

The IMSL Library's annual license fee on the Pyramid 900 systems is $2,500 for the first year and $2,000 for a renewal.

IMSL, 2500 City W. Blvd., Houston, Texas 77042.

■

Apollo Computer, Inc. has introduced its **Domain/Performance Analysis Kit** (PAK), a set of computer-aided software engineering tools.

Domain/Pak consists of the The Domain Performance Analysis Tool, said to refine performance data down to the procedure level; the Display Process Status, used to learn how an application as a whole shares system level resources; and the Histogram Program Counter, used to obtain a detailed look at execution time within a given procedure.

Domain/PAK costs $250 per node and $980 per site.

Apollo Computer, 330 Billerica Road, Chelmsford, Mass. 01824.

Applications packages

Manufacturing and Consulting Services, Inc. has announced the availability of its **Anvil-5000** computer-aided design and drafting and computer-aided manufacturing software to run on the IBM RT Personal Computer.

Anvil-5000 is said to integrate wire frame, surface and solid modeling, finite element mesh, drafting and numerical control into a single package using the same data structure and the same interactive interfaces.

Anvil-5000 workstation licenses range from $5,000 per workstation to $19,000 per workstation for 12 workstations.

Manufacturing and Consulting Services, 9500 Toledo Way, Irvine, Calif. 92718.

Languages

Whitesmiths, Ltd. has announced **Version 2.3** of **C/370**, its C compiler for the IBM mainframe environment.

C/370 enables the development of C programs in the IBM mainframe environment and allows software developers to port existing applications to the IBM 370.

The major enhancement in Version

Continued on page 94



How to give them complete hands-on training without them getting their hands on your mainframe.

Introducing MENTOR/IMS the unique, fully-featured IMS/VS master terminal simulator that runs on an IBM PC or compatible.

Mentor/IMS is the first and only software package to provide full IMS/VS operator training, operational recovery procedure, rehearsal and error situation simulation, without interfering with your mainframe systems. Completely flexible, it customizes to your own transaction codes, database names, logical terminal names, etc, to create a uniquely cost-effective and safe training and diagnosis tool.

Mentor/IMS supports all operands of all IMS/VS master terminal commands and behaves and responds exactly like a normal IMS/VS MTO terminal. All types of IMS/VS restart are simulated and full support is also provided for unsolicited and random events, such as system checkpoints, transaction abends, execution of BMPs, etc.

Created by Span Software Consultants, who have an impressive, 10-year record of mainframe software success all over the world, Mentor/IMS is developed and supported to the highest standards, with maintenance and upgrades for new IMS/VS releases and features assured.

Quite simply, it means that now, with just a personal computer, you can totally separate training from your mainframe system, provide self-study and revision facilities, and give genuine experience and disaster recovery training without risk or inconvenience.

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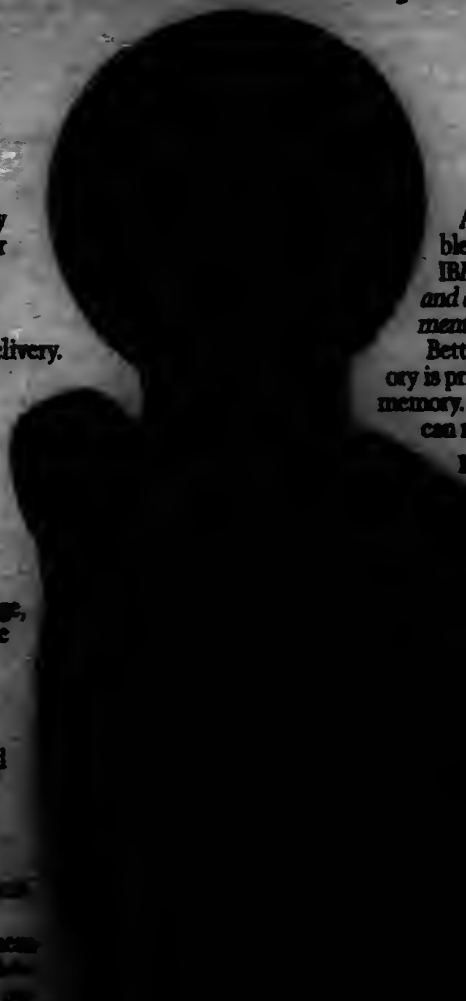
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Insufficient main storage is the single biggest limitation on the performance of your System/36.

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What makes EMC add-in memory better.

To start with, EMC's new 512Kb and 256Kb memory cards utilize 256K RAM technology. Our 256Kb card, for example, has almost 50% fewer components and interconnections than IBM's. So it's inherently more reliable and consumes less power.

What's more, every single EMC memory board undergoes a rigorous burn-in test and burn-in procedure in one of our own System/36's.

Our quality control pays off, too. For thousands of IBM users who rely on our memory for even their most critical applications.

We've [illegible]

And EMC memory boards are 100% compatible with your System/36. They fully support all IBM memory and memory diagnostic routines—*and do not affect your IBM maintenance agreement in any way.*

Better yet, EMC's new 512Kb and 256Kb memory is priced a full 25% less than IBM's comparable memory. Our volume discounts and trade-up credits can make your savings even greater.

100% money-back guarantee.

If you're not 100% satisfied with your EMC memory for any reason, simply return the board within 30 days and we'll *refund 100% of your money.* No questions. No hassles. And of course, no waiting.

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Continued from page 92

2.3 is MVS/XA support, which allows C programs to reside anywhere in the 2G-byte address space available under MVS/XA.

It supports arrays larger than 16M bytes. Other new features include improved command line parsing and the ability to use 8-char. external names.

C/370 costs $5,000.

Whitesmiths, 97 Lowell Road, Concord, Mass. 01742.

Utilities

Teradyne, Inc. has announced its **Automated Remote Control** (ARC) software.

ARC is said to permit the setup, monitoring and troubleshooting of A300-Series Analog Large-Scale Integration Test Systems anywhere in the world from a terminal of the Test System Director (TSD), the host computer of Teradyne's Teranet automatic test equipment networking system.

From a TSD terminal working with the ARC software, users can load, set up and run test programs; debug test programs; calibrate a tester; and send test data to a line printer or to the host computer for storage.

ARC costs $30,000.

Teradyne, 321 Harrison Ave.; Boston, Mass. 02118.

■

Eurosoft International, Inc. has announced **Macnix**, a software package said to provide Unix users with an interface to Apple Computer, Inc.'s Macintosh.

Macnix takes advantage of the Macintosh terminal to perform graphics operations. The host mainframe provides storage and multiuser support.

Macnix is said to be a unified virtual file system defined by the Unix files plus the Macintosh's diskette. The mainframes supported include Digital Equipment Corp.'s VAX, Sperry Corp.'s Personal Computer IT, NCR Corp.'s Tower and AT&T's 3B2 and 3B5.

Macnix costs from $1,000 to $7,500.

Eurosoft International, 14082 Loma Rio Drive, Saratoga, Calif. 95070.

■

Talaris Systems, Inc. has released **Version 2.1** of its **Laserplot** graphics support software.

Laserplot Version 2.1 is said to provide users with easy access to Talaris' 2400, 1200 and 800 laser printers' plotting capabilities. It offers a user-callable subroutine library written in Fortran 77 for developing graphics, filters that permit users to convert graphics from device or software-dependent formats to the Talaris laser printer format and interfaces to other graphics packages.

Laserplot Version 2.1 is priced at $1,700.

Talaris Systems, P.O. Box 261580, 5160 Carroll Canyon Road, San Diego, Calif. 92126.

■

Maersk Data, Inc. has introduced **MD-Slide**, said to allow direct connection of Hewlett-Packard Co.'s 7510 Color Film Recorder to IBM mainframes using IBM's Graphical Data Display Manager (GDDM) graphics.

MD-Slide is a resident system program that converts GDDM/Admprint files to HP's graphics language commands and replaces the existing file with the new file. The Maersk Data spool system then sends the graph to the HP 7510 connected to the controller with a protocol converter. If the user wants to change the font, palette or background, entry into a full-screen program allows the manipulation of backgrounds and palettes.

MD-Slide costs $7,500.

Maersk Data, 25 Vreeland Road, Florham, N.J. 07932.

Training software

Comprehensive Software has added the **Introduction to Electronic Spreadsheets** to its Intro series of training software for IBM Personal Computers and compatibles.

The program is said to explain what spreadsheets are as well as providing background for determining their needs. It features Lotus Development Corp.'s 1-2-3.

Topics include creating work sheets, functions, formulas, ranges, macros, data bases, graphics, cross-checking, combining work sheets and design principles.

Each of the five products in the series costs $59.95.

Comprehensive Software, Suite G, 2316 Artesia Blvd., Redondo Beach, Calif. 90278.

The new Diconix 150. At under four pounds,
It's the one PC printer you can



NEW PRODUCTS/SOFTWARE & SERVICES

Software Express has released its **Operator Training Tutorial** software package for training end users on Appgen applications.

The Operator Training Tutorial is said to take novice end users through such procedures as system logon and logoff, menu selection, data entry procedures and editing shortcuts.

The Operator Training Tutorial program is available on machines that are running AT&T's Unix and Microsoft Corp.'s Xenix.

The program costs $95 for both the software and manual.

The manual is available separately at a cost of $50.

Software Express, 7th Floor, 2925 Briarpark Drive, Houston, Texas 77042.

Services

IBM has announced **additional maintenance service** for third-party add-ons for its Personal Computer.

Ten of the products added to the list are configurations of AST Researeh, Inc.'s Advantage multifunction boards.

The other products include the Hewlett-Packard Co. Thinkjet printer, the Emulex Corp. DCP 88VM board and the Forte Data Systems Co. Graph Card and Forte PJ.

Other added products include the Hercules Computer Technology, Inc. Color Card and Hercules Graph Card and Digital Communications Associates, Inc. Irma 1.42 board.

A customer with an IBM PC including third-party cards serviced by IBM can add the cards to the maintenance agreement or withdraw the entire machine from the agreement.

Annual carry-in minimum maintenance fees range from $35 to $270.

On-site repair costs $10 more.

IBM, Old Orchard Road, Armonk, N.Y. 10504.

■

Dow Jones Information Services has announced **Quicksearch**, a service to aid an on-line search for company information.

A complete Quicksearch report is said to include a current quote, the latest news current to 90 seconds and s financial and market overview.

The report also includes earnings estimates, company vs. industry performance. quarterly income statements and balance sheets and company profiles.

Users can search for information using the company name or stock symbol.

Quicksearch costs $39 for a complete company report.

Dow Jones, P.O. Box 300, Princeton, N.J. 08540.

■

Tectran Corp. has introduced a national **For Sale By Owner** electronic listing service for used computer equipment.

The service allows sellers to establish a listing of their equipment.

Buyers are provided with the names and telephone numbers of sellers free of charge.

Listings access is available on the vendor's 1,200 bit/sec. Digital Equipment Corp. VT100 emulation data line.

A one-time listing fee is paid to activate the listing. The size of the fee depends upon the asking price of the equipment, starting at $29.95 for equipment worth less than $2,000.

Tectran, 780 Wellington Ave., Cranston, R.I. 02910.

MICROS

Systems

Mighty Computers Co. has introduced **MC-32 Personal Supermini**, a 32-bit personal computer workstation.

MC-32 runs under the host personal computer's Microsoft Corp. MS-DOS operating system. It is said to feature a coprocessor board powered by the National Semiconductor Corp. 32032 32-bit CPU with up to 8M bytes of onboard memory.

The MC-32 can also run AT&T's Unix System V, Version 5.2 to become a multitasking, multiuser system with file and record locking capabilities, according to the vendor.

The MC-32 Personal Supermini system with 1.5M bytes of random-access memory, a 10-MHz coprocessor and a 20M-byte hard disk costs $3,500.

Mighty Computers, Suite 207, 4529 Angeles Crest Highway, La Canada, Calif. 91011.

you can even carry it under your arm.
take lightly. Anywhere.



DICONIX
A Kodak Company

3100 Research Boulevard
Dayton, Ohio 45420
1-800-DICONIX

Acctex Information Systems has announced a **turnkey optical disk-based document storage and retrieval system**.

The system is composed of the vendor's indexing and search software with a write-once, 5¼-in. optical disk.

It includes an IBM Personal Computer AT, a document digitizer-scanner and an optical disk drive.

According to the vendor, the system also includes customized application software and a full-page bit-mapped display. It also includes a laser printer.

The modular system is said to be able to be expanded to multiple image workstations by adding a local-area network and utilizing multiple optical disks as image servers.

The document storage and retrieval system is priced at $49,900.

Acctex, Suite 600, 131 Steuart St., San Francisco, Calif. 94105.

■

Philips Information Systems, Inc. has announced the **Philips P3102** and **P3200** personal computers.

Both systems were designed to act as intelligent workstations and also to act as stand-alone tools, according to the vendor.

The P3102 features color graphics emulation and IBM Personal Computer compatibility, the vendor said.

The machine reportedly offers 512K bytes of memory, expandable to 640K bytes.

It runs under Microsoft Corp.'s MS-DOS 3.1.

The P3200 is an IBM PC AT compatible.

It is available with one 1.2M-byte floppy drive or one 1.2M-byte drive and a 25M-byte hard disk drive.

The computer has eight expansion slots and a 12-in. monochrome monitor. In addition, it runs under MS-DOS 3.1

The P3102 is priced from $1,752, and the P3200 is priced from $3,795.

Philips Information Systems, Suite 300, LB 35, 15301 Dallas Pkwy., Dallas, Texas, 75248.

Software applications packages

Baker & Rabinowitz, Inc. has introduced the **Personal Applications Executive** (PAX) operating system for IBM Personal Computers.

PAX is said to give software developers multitasking advantages.

The operating system includes features such as high-speed device drivers and a completely functional demonstration system, the vendor said.

The drivers include optimized assembly-language procedures for video display, printer output and interrupt management.

The complete PAX system costs $149.95.

Baker & Rabinowitz, 3869 Kilbourne Ave., Cincinnati, Ohio 45209.

■

American Teledata Corp. has announced **Amtel Credit Reporting**, a software package that is said to automate inquiries made to credit bureaus.

Amtel Credit Reporting is able to minimize credit bureau access charges.

The system reportedly selects the best bureau for a specific geographic area and then calls up the bureau using a preconfigured ZIP code table.

The credit information is saved on disk and may be printed or reprinted at any time. This procedure provides complete archive capabilities.

Amtel Credit Reporting simultaneously processes up to 200 applicants, according to the vendor.

Amtel Credit Reporting works on IBM Personal Computers and compatible machines.

The software package is priced at $295.

American Teledata, Building 320, 8100 S. Akron, Englewood, Colo. 80112.

■

Intex Software Systems International, Ltd. has introduced a multilingual word processing program called **Intext** for IBM Personal Computers.

According to the vendor, Intext can change from one language to another in midtext. It automatically reconfigures the computer keyboard to the national standard of any of 41 foreign languages, including non-Roman alphabets and those written from right to left.

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On-Line Software International, Inc.

Two Executive Drive, Fort Lee, NJ 07024

1-800-526-0272

Or in New Jersey call 201-592-0009.

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Output can reportedly be printed on dot matrix, laser or letter-quality printers.

Graphics capability is needed for languages with non-Roman alphabets.

Intext is priced at $495 for two languages.

Intex Software, 488 Madison Ave., New York, N.Y. 10022.

■

The Crosby Co. has announced a statistical process control software package called **X & R Master.**

The package is said to perform X-bar and R-type statistical process control calculations.

It produces control charts and process capability reports.

It prints average, range, tolerance, standard error, moving mean and distribution charts.

The process capability studies are controlled by a menu and calculations and tests for control are automatic.

X & R Master is priced at $59.95.

Crosby, P.O. Box 2433, Glen Ellyn, Ill. 60137.

■

Syntactics Corp. has announced the availability of its **Crystalwriter Plus** object-based word processing software for the IBM Personal Computer AT and compatibles running under Microsoft Corp.'s Xenix-based systems.

According to the vendor, Crystalwriter Plus features object-based design for text handling, a spelling checker and corrector, automatic footnoting, text merge and an integrated forms editor and records manager.

Crystalwriter Plus is also used on systems running under Bell Laboratories' Unix System V, System III and the University of California at Berkeley System 4.2.

Crystalwriter Plus costs $695.

Syntactics, Suite 145, 3333 Bowers Ave., Santa Clara, Calif. 95054.

■

Gordon Group has announced its **Before You Leap** knowledge-based software project estimation and scheduling package.

Before You Leap is said to provide schedule estimates for financial, military-standard, scientific or any other type of software written on microcomputers, minicomputers and mainframes.

Before You Leap can also reportedly forecast detailed manloading requirements by task across the major time phases of the software project.

In addition, the program can be used as a macro estimation tool, making a single estimate for each software project, according to a company spokesman.

Before You Leap is priced at $495.

Gordon Group, Suite 321, 2530 Berryessa Road, San Jose, Calif. 95132.

Software languages

Online/Database Software, Inc. has introduced a Cullinet Software, Inc. **IDMS compatible/Cobol workstation** for use with The Application Builder (TAB).

With the inclusion of the IDMS compatible/Cobol workstation, TAB users can create, edit, develop and run an IDMS/R Batch Cobol program.

TAB operates on an IBM Personal Computer XT, Personal Computer AT or compatible with 640K bytes of memory and a minimum of 6M bytes on hard disk.

TAB and its various components are priced at $6,100. Current users can upgrade for $1,000.

Online/Database Software, One Blue Hill Plaza, Pearl River, N.Y. 10965.

Software utilities

American Programmers Guild, Ltd. has announced **Xpack**, a file transfer and security software package.

Xpack is said to allow users to encrypt any file to be sent through standard seven-bit electronic mail such as MCI Communications Corp.'s MCI Mail or ITT's Dialcom.

Features include the ability to use menus or to run directly from Microsoft Corp.'s MS-DOS, to encrypt all documents and to run communications software directly from the Xpack menu in order to send files immediately after they are encrypted.

Xpack runs on IBM Personal Computers or compatibles and costs $49.95 per copy.

American Programmers Guild, 12 Mill Plain Road, Danbury, Conn. 06811.

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NEW PRODUCTS/MICROCOMPUTERS

Microsolutions, Inc. has introduced **Unidos**, a software program said to allow IBM Personal Computer and compatible users to run 8-bit Digital Research, Inc. CP/M programs directly on the PC without additional hardware.

Unidos is said to emulate a Zilog, Inc. Z80 microprocessor and create a complete CP/M Version 2.2-compatible environment for running 8-bit CP/M software. Unidos executes Z80 instructions and does not require any changes to CP/M programs. Unidos features a built-in support if the PC has a NEC Corp. V-Series microprocessor installed.

Unidos is priced at $69.95, according to the vendor.

Microsolutions, 125 S. Fourth St., DeKalb, Ill. 60115.

■

Softcorp has introduced **Toolkit II**, a histogram printing program for its Advanced Pro-Path 6 project management package.

Toolkit is a utility program said to produce cost and resource allocation histograms from Advanced Pro-Path 6 project files. According to the vendor, it works without modification to existing project files.

Toolkit II can send histograms to a variety of devices, such as the computer screen or disk file. Printers do not require graphics capabilities.

Toolkit runs on IBM Personal Computers. It costs $49. Advanced Pro-Path 6 costs $199.

Softcorp, Suite 244, 2340 State Road 580, Clearwater, Fla. 33575.

■

Microport Systems, Inc. has introduced **System V/AT**, a version of AT&T's Unix System V Release 2 IAPX286 Version 1 designed for the IBM Personal Computer AT.

System V/AT is said to feature a virtual screen windowing system, dynamic disk buffer allocation for random-access memory disk performance, file system hardening and a symbolic debugger.

The runtime system costs $159. The software development system and the text processing system cost $169 each. Together, they cost $439.

Microport Systems, 10096 Soquel Drive, Aptos, Calif. 95003

■

Structured Software Systems, Inc. has announced **SDF200**, a language enhancement said to add a hierarchic disk directory format to the Basic and Pascal operating systems for Hewlett-Packard Co. Series 200 and 300 desktop computers.

SDF200 provides single-workstation users with the structured directory format for the operating systems without requiring a shared resource manager controller.

Features include multiple-tree-structured directories, logical file groupings, 16-char. file names, extendable files and directories and selective backup and compatibility with shared resource manager and Series 500 disks.

SDF200 costs $600, the vendor said.

Structured Software Systems, 1072 Irick Road, Mount Holly, N.J. 08060.

■

Microsolutions, Inc. has announced **Matchpoint-PC**, said to allow IBM Personal Computer users to read from and write to Apple Computer, Inc.'s DOS, Prodos, SOS and Apple CP/M disks.

The Matchpoint-PC package consists of the Matchpoint-PC card and software disk and a copy of Uniform-PC Version 2, designed to work with the Matchpoint-PC card.

Uniform-PC is said to make the computer see CP/M disks as IBM PC-DOS disks. Matchpoint-PC also allows the use of Apple Softcard and Northstar CP/M disks as though they were DOS disks.

Matchpoint-PC is priced at $195.

Microsolutions, 125 S. Fourth St., DeKalb, Ill. 60115.

Solutions, Inc. has introduced **Glue** for Apple Computer, Inc.'s Macintosh.

Glue is said to add a print-to-disk capability to most Macintosh applications, enabling desktop publications to include graphics from almost any Macintosh applications in a newsletter. Glue is also said to facilitate the electronic distribution of newsletters, because once a newsletter has been printed to disk it can be routed through a network or an elec-



tronic mail system.

According to the vendor, the images copied by Glue are not limited by the size of the Macintosh screen.

Glue is priced at $49.

Solutions, P.O. Box 989, Montpelier, Vt. 05602.

Software data base management systems

Dynamic Graphics, Inc. has introduced **Desktop Art** for use with Apple Computer, Inc.'s Macintosh.

The software is composed of volumes of digitized graphics selected from the company's library of illustrations and photos. Each volume contains at least 300 illustrations stored on two diskettes as Macpaint documents.

The first two volumes are Graphics & Symbols 1, a collection of pictograms and symbols, and Artfolio 1, a compilation of people, objects and animals.

Graphics & Symbols 1 costs $66.95, and Artfolio 1 costs $74.95.

Dynamic Graphics, P.O. Box 1901, 6000 N. Forest Park Drive, Peoria, Ill. 61656.

■

Intermec Corp. has announced **PCLM**, its multipurpose personal computer label manager.

PCLM is said to give users the ability to create and store an infinite number of label formats on floppy or hard disks. It offers a label audit feature that tells how many labels have been produced. It also includes a library of preformatted labels.

PCLM is said to be written around the Revelation data base management program and allows users access to other DOS files downloaded from the mainframe.

PCLM is priced at $695.

Intermec, P.O. Box 360602, 4405 Russell Road, Lynwood, Wash. 98046.

Software enhancements

Software Directions, Inc. has announced **Printq Version 3.0**, its print spooling software for the IBM Personal Computer.

Version 3.0 is said to provide the ability to begin printing a report while that report is still being spooled. Changes have also been made in the Printq Status Display.

According to the vendor, Printq was designed after the print spooler used in the IBM System/38.

Software Directions, 1572 Sussex Tnpk., Randolph, N.J. 07869.

COMMUNICATIONS

Controllers

Netronix has announced the **MNA100** Multibus network adapter designed to provide Intel Corp. Multibus-based systems with access to the IBM PC Network.

The adapter is said to be completely IBM PC Network-compatible at both the hardware and protocol levels. It features an Intel 80188 CPU that provides protocol processing through the session level. The host system communicates with the adapter via dual-ported memory.

The adapter operates on a CATV-type broadband system. It costs $1,595.

Netronix, 1372 N. McDowell Blvd., Petaluma, Calif. 94952.

Voice/data communications

Votan has introduced its **Votan Telecenter** IBM Personal Computer-based voice mail system with voice recognition capabilities.

Votan Telecenter records, plays back and distributes individualized messages. The system's voice recognition capability is said to enable users to utilize functions by using voice commands.

The Votan Telecenter ranges in price from $10,950 to $19,450.

Votan, 4487 Technology Drive, Fremont, Calif. 94538.

Software

LaSalle Micro, Inc. has released **Version 1.2** of **Backcomm**, its communications software program that operates in the background of IBM Personal Computers and compatibles.

Backcomm 2.1 includes such features as the ability to encrypt and decrypt files and to squeeze and unsqueeze files without leaving the program. It also offers password protection and automatic call scheduling by day, date and time.

Backcomm also features a built-in command language, Backtalk, which allows for communication as well as

Continued on page 100

e
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Continued from page 99

disk file read and write; and interfacing to other programs executing simultaneously on the computer.

Backcomm costs $95.

LaSalle Micro, 1350 Remington Road, Schaumburg, Ill. 60196.

Multiplexers/Modems

Astrocom Corp. has enhanced its **E299 Squeeziplexer**.

The E299 Squeeziplexer is now rack-mountable so that up to four units can be contained in one rack. According to the vendor, the E299 supports up to 32 IBM Category A or compatible terminals or printers at distances of up to 10,000 ft through the use of four RG62A/U coaxial cables. The E299 demultiplexes data from any IBM 3274 Model 41 or 3274 Model 61 series controller equipped with the optional 9901 extended time-out interface.

The E299 is available in 8-, 16-, 24- and 32-port configurations. The 32-port configuration costs $2,930.

Astrocom, 120 W. Plato Blvd., St. Paul, Minn. 55419.

■

Scitec Corp. USA has announced the **Scitec Saturn D4** advanced T carrier modem.

The modem is said to operate between NRZ data equipment and the North American terrestial DSI service.

It features standard primary rate speeds of 1.536M bit/sec. and 1.344M bit/sec., as well as subrate speeds that are multiples of 56K bit/sec. and 64K bit/sec. Scitec D4 provides both D4 and extended superframe framing on the network side.

Scitec Saturn D4 costs $3,500.

Scitec, 850 Aquidneck Ave., Middletown, R.I. 02840.

■

Creative Digital, Inc. has introduced the **Mercury Fastmodem 1200B** internal modem for IBM Personal Computers and compatibles.

The modem is said to feature autoanswer, tone- and pulse-dial capabilities and connection to most time-sharing systems as well as to other personal computers.

The modem operates asynchronously at 1,200 bit/sec. with a fallback to 300 bit/sec.

In autoanswer mode, the modem automatically detects and responds to the transmission speed of the calling modem.

Mercury Fastmodem 1200B costs $299.

Creative Digital, Suite D207, 1620 Old Oakland Road, San Jose, Calif. 95131.

Test equipment

Electrodata, Inc. has enhanced its **CTS 3** communications test set.

The data and capture buffers of the CTS 3 have each been doubled to 4,000 characters, and built-in routines have been added to perform bisynchronous and Synchronous Data Link Control spooling tests, VDT and printer tests and terminal simulation routines and echo tests.

Eighteen preprogrammed setup menus for monitoring and trapping applications have also been added, according to the vendor.

The CTS 3 costs $1,995.

Electrodata, 23020 Miles Road, Bradford Heights, Ohio 44128.

■

TITN, Inc. has introduced its **Experdata E20 Ethernet Tester**.

The E20 allows users to test Ethernet local-area network components to see if they conform to Ethernet Version 1.0, 2.0 or 802.3 standards.

According to the vendor, the test also measures traffic on the network and simulates different types of traffic for capacity planning and troubleshooting.

Experdata E20 can be used to check transceiver functions such as the transmit and heartbeat before installation on a network as well as to perform echo and collision tests and line-quality test work.

The Experdata E20 Ethernet Tester costs $4,500.

TITN, 5591 W. 78th St., Edina, Minn. 55435.

SYSTEMS & PERIPHERALS

Data storage

Southern Data Systems, Inc. has introduced the **SDS 2290V** family of disk drives for Wang Laborstories, Inc. VS computer systems.

The SDS 2290V disk drives range in capacity from 76M bytes to 576M bytes. Each drive is either a 76M-byte removable drive or a 288M-byte fixed drive.

The 288M-byte fixed drive supports a 30,000-hour mean time between errors. Both drives utilize standard cables and are plug-compatible with Wang 2265V-2 and Control Data Corp. 9766 disk drives.

The SDS 2290V disk drives cost from $8,395 for the 76M-byte model to $19,290 for the 576M-byte model.

Southern Data Systems, P.O. Box 31192, Raleigh, N.C. 27622.

■

Emulex Corp. has introduced the **UC14** Unibus host adapter designed to connect a Digital Equipment Corp. PDP-11 or VAX-11 series computer to the small computer systems interface (SCSI) while implementing DEC's Mass Storage Control protocol.

The host adapter combines with Emulex S2/SCSI, enhanced small disk interface and ST506 disk and tape controllers. The user can choose from a variety of 5¼-in. Winchester disk drives and ¼-in. cartridge tape

Continued on page 102

With MULTSESS system support software, handling multiple VTAM applications isn't an amazingly difficult feat. MULTSESS is easy to install, easy to maintain and easy to use, giving you the capability to access multiple VTAM applications—or even two or more connections to one application—from any number of 3270 type terminals in your system.

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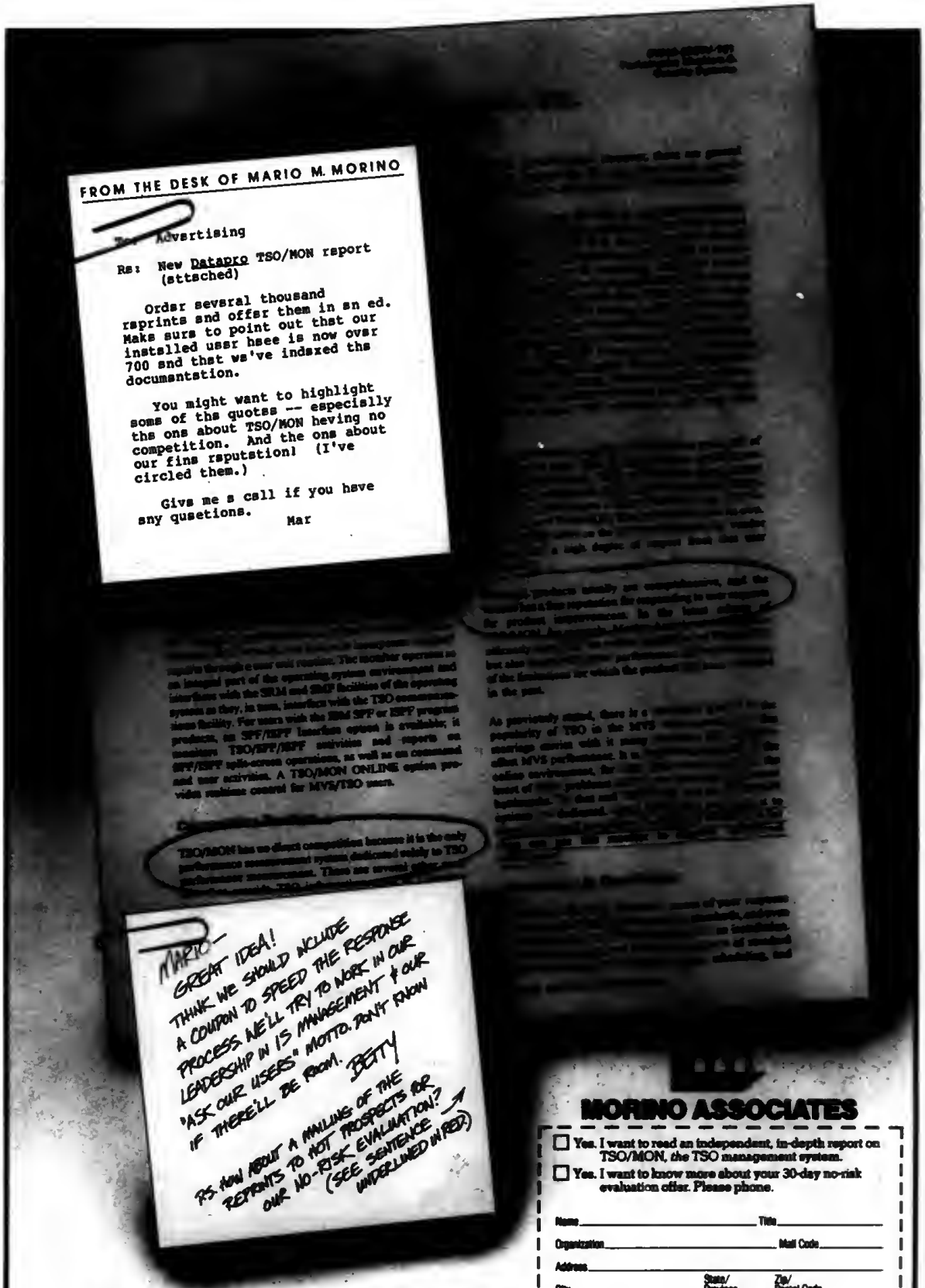
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drives. Features include direct memory access, optical disk drive support, an SCSI-protocol controller and 18-bit addressing.

The UC14 is priced at $2,200.

Emulex, P.O. Box 6725, 3545 Harbor Blvd., Costa Mesa, Calif. 92626.

Terminals

Codonics, Inc. has introduced the **1-300 graphics enhancement package** designed to provide Wyse Technology, Inc. 50 and 75 terminals with Tektronix, Inc. 4010 and 4014 emulation.

Features provided include 1,024-by 800-pixel graphics display and a 1,024- by 1,024-pixel physical memory area.

The vector drawing rate is said to be more than 1,000,000 pixel/sec., and the data transfer rate is 38.4K bit/sec.

The complete 1-300 graphics enhancement package costs $1,095.

Codonics, 18001 Englewood Drive, Middleburg Heights, Ohio 44130.

■

HOB Electronic has announced the **Series 80** family of IBM 3270-compatible terminals.

The terminals connect to IBM's 3274 and 3276 cluster controllers and use a two-component architecture combining a 16-bit terminal microprocessor with the firm's mainframe terminal control program, Codis.

Models include the HOB 88R 3178-compatible with 15-in. screen; the HOB 88S 3178-compatible with 15-in. screen, user-specific functions, programmability and an RS-232C port; the HOB 89S; the HOB 88S with a 14-in., seven-color screen; the HOB 88E 3270-compatible featuring multiple sessions, electronic notebook and data compression and selection; and the HOB 89E, with the same features as the 14-in. color screen HOB 88E.

Prices are $1,590, $1,990, $2,390, $2,390 and $2,790, respectively.

HOB Electronic, Bldg. D, 7 Kimball Lane, Lynnfield, Mass. 01940.

Printers/Plotters

Laserlink Systems, Inc. has announced its **Laserlink Expansion Card** for the Canon, Inc. LBP-8 A1 desktop laser printer.

According to the vendor, the Laserlink Expansion Card gives the Canon A1 laser printer full bit-map raster graphics, vector graphics and forms and multiple font capabilities.

The card is also said to provide the Canon A1 laser printer with 1.125M bytes of random-access memory. With the expansion card, the Canon A1 can be upgraded to match the full-page, 300 dot/in. graphics capacity of the Canon LBP-8 A2.

The Laserlink Expansion card costs $995.

Laserlink Systems, 161 Knollwood Drive, San Rafael, Calif. 94901.

■

CIE Terminals has announced that its **Lips 10 Laser Printer** is compatible with Hewlett-Packard Co.'s Laserjet printer.

Lips 10 is said to provide a 10 page/min. print speed compared with Laserjet's 8 page/min. The printer also has an additional 11 Laserjet-compatible font cartridges. One feature is the printer's two simultaneous on-line font cartridges that are operator-controlled either at the printer's panel or by the software.

The Lips 10 printer costs $3,495. An upgrade compatibility kit costs $200. The fonts are priced from $195 to $345 each.

CIE Terminals, 2505 McCabe Way, Irvine, Calif. 92714.

■

Seikosha Co. has introduced the **MP-1300** convertible monochrome-to-color printer.

The MP-1300 is said to be capable of producing draft-quality printing at 300 char./sec. and letter quality at 75 char./sec.

It features 185 IBM and ASCII software-generated character sets and eight international fonts, as well as graphics. Other features include rear and bottom paper loading and parallel and serial interfaces.

There is an optional snap-in, seven-color printing kit to add full-color alphanumerics and graphics printing.

The MP-1300 costs $799, and the optional color printing kit costs $155.

Seikosha, Suite SW3/249, 10080 N. Wolfe Road, Cupertino, Calif. 95014.

PRICE REDUCTIONS

Micro-Term, Inc. has announced price reductions for its **400 series** of terminal products.

Specific reductions are as follows: Model 420 from $695 to $595; Model 425 from $895 to $695; Model 440 from $1,695 to $1,495; and Model 450 from $595 to $545.

Micro-Term, 512 Rudder Road, Fenton, Mo. 63025.

■

Algor Interactive Systems, Inc. has reduced the price of **Supersap**, a finite element for stress, dynamic and heat transfer analysis for the IBM Personal Computer AT and compatibles.

Said to offer unlimited problem size, Supersap comes on 20 360K-byte diskettes. It contains two- and three-dimensional mesh generators, an interactive model editing system, preprocessing and 3-D graphics display on the front end. On the back end, it has postprocessing for stresses, displacements and heat flux.

Supersap now costs $1,500.

Algor Interactive Systems, Essex House L1, Essex Sq., Pittsburgh, Pa. 15206.

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A complete list of things to know about 2400 bps modems.



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COMPUTER INDUSTRY

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SRC stumbles over start-up hurdles in connectivity mart

Late product arrivals, layoffs trouble firm

By Stanley Gibson

NATICK, Mass. — Despite targeting one of the most important areas in the computer industry today — multivendor connectivity — Software Research Corp. (SRC) finds itself in a perilous situation due to many woes characteristic of start-up companies.

In the last six months, SRC has seen almost half of its 125-member work force depart, either voluntarily or through layoffs. Company officials point to delays in getting SRC's ambitious products to market as the reason for the layoffs.

SRC's major product is Strategic Network Exchange (SNE), which is intended to connect a number of different computers from vendors such as Wang Laboratories, Inc., Digital Equipment Corp. and IBM. But SRC's problems came about because of the difficulty of marrying a software engineer's dream with the right kind of management expertise.

"They tried to do too much too fast. They were trying to do something that was unparalleled," says George Colony, president of Forrester Research, Inc. of Cambridge, Mass. "They had problems from the beginning because they couldn't explain the product to anyone. I don't think the management or venture capitalists ever understood what the product was."

Founded as a consulting firm in 1978, SRC began product development in 1984 with the first round of what would reportedly total $11 million in venture capital over the following two years. Investors include the venture capital firms Eastech Management Co. and Welsh, Carson, Anderson & Stowe, neither of which would comment on the present status of SRC.



The company required additional funds of an unspecified amount in May of this year, according to several sources.

"The layoffs were a result of not being able to have the product on time — to get the revenues up to the level we needed," says Eduardo Stecher, SRC's marketing vice-president. Stecher cofounded SRC with Alan Vecchio to provide network consulting services to vendors developing IBM-compatible equipment.

"It was a lot more complex than we ever thought," Stecher says of the company's efforts to develop multivendor connectivity software.

Bernie Wess, an independent consultant based in Needham, Mass., voices a similar view. "How can a small company solve the problems that IBM has to solve?" he asks. "It's an extraordinary undertaking."

Stecher says SNE has been shipped to 16 companies, some of which are using it on a trial basis.

One user from a large financial services company says his company decided to use SRC's software, rather than DEC or Wang IBM connectivity software, because it wanted a single-user interface for data transfer and electronic mail.

"We're very pleased with how it has gone. Our concern is that they missed target dates," the user says. "Perhaps they tried to be too co-operative with early customers."

He adds that the young company concentrated on customizing early releases of the software at the expense of developing a strong generic product. The user claims that SRC did not provide timely product documentation.

"If they go out of business, it'll be something of a disaster," the user adds.

On May 22, Martin Waters was named SRC president and chief operating officer, taking over control of day-to-day operations from Paul Tucker, who had been president and CEO. Tucker then became chairman and retained his CEO position.

Tucker, a 23-year Honeywell, Inc. veteran, was brought in to run SRC in 1984. Several sources say the sales-oriented approach Tucker brought from Honeywell was not ideally suited to an entrepreneurial company such as SRC, in which product development was the first priority.

"I understand how to get a product from concept to market," Waters says. He previously worked as CEO of Ordain, Inc., a now-defunct Los Angeles-based maker of a relational data base machine. Prior to that, Waters was general manager of the business systems division of Perkin-Elmer Corp.

He says SRC will not need additional cash before year's end, by which time the company's business plan calls for profitability to be achieved through the sale of its software products.

Waters does not rule out the possibility of SRC being acquired to ensure its long-term survival, but he says no negotiations are in progress.

Stecher says a sale could improve the company's prospects. "The investors are pursuing making money. As a company, we would be better off if we could work with a big company — to find a financial sponsor in someone who is closer to our goals than the investors," he says.

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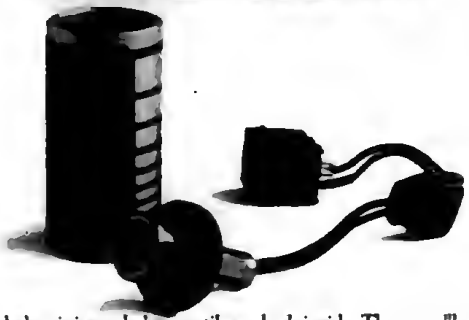


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Hogan-IBM wedding bells may sound hollow to bank MIS



OUTSIDE LINES
M. Arthur Gillis

When Hogan Systems, Inc. and IBM announced their marketing agreement in May, the bank MIS community did not end up with a stronger single-vendor-supported turnkey system. Instead, it got a software package developed and maintained by Hogan and a computer built by IBM But now the difference is that IBM sells them both.

What ever happened to the idea that when two complementary organizations pool their resources, the result is not just the sum of the parts, but something more?

Who will benefit from this new arrangement? Clearly, it is good for Hogan. The stock market proved that. There is no better way to beat the competition than to have IBM affix its seal of approval on a product. Psychologically, this marriage gives the impression that the leading hardware company has just identified Hogan as the leading bank software company.

What is in it for IBM? Surprisingly, there is just as much psychological impact for IBM as for Hogan. IBM knows that it is not as easy to win anymore as it was in the old days. Its weaker earnings performance last year was the first sign.

IBM cannot just sell iron today, because others can do that even without the polish. Also, IBM's biggest competitor in the banking industry, Burroughs Corp., will get even bigger with the addition of Sperry Corp.

IBM always claimed it was in the solutions business. Now it can demonstrate it with software because, in terms of complexity and work load, 90% of a solution comes from software.

It takes two days to install, test and run diagnostics on an IBM 3090. Add two weeks for systems software testing, and the hardware environment is ready. By comparison, it takes about five years to fully install the Hogan system.

In dollars, that 3090 may have cost the user $3 million to $4 million. Total cost to a financial institution for the Hogan system, including implementation, is more than $6 million.

In the bowels of the MIS shop

Although IBM can theoretically offer the total solution, it may only be able to sell that idea in the executive suite. Will IBM be able to perform in the bowels of the MIS shop where the implementation is conducted?

It is doubtful. After 28 years' worth of systems implementation projects and conversions, I have learned to side with the team that learned from actual experience. It takes computer technicians, as well as bank operations professionals, to do a complete job. Where is IBM going to get those people?

Typical IBM systems engineers are great when it comes to MVS/XA, CICS, IMS and generic systems knowledge. But they will be hard-pressed to provide implementation support for one of the most complex applications packages ever developed.

If IBM's contribution is marketing, then one would have to ask why it needs thousands of generic sales reps to sell to fewer than 500 financial institutions. Hogan does not need IBM's sales clout unless it is to rebuild Hogan's credibility.

Every large financial institution knows about Hogan's reputation, based on both its success as well as its failure when it could not de-

See HOGAN-IBM page 106

Gillis is an Atlanta-based software consultant to large banks and financial institutions. He is a former senior vice-president of Fleet National Bank in Providence, R.I., and the author of several books, including Microcomputers in Financial Institutions.



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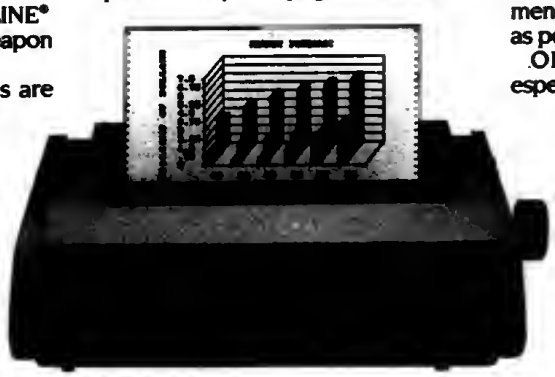
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U.S. Sprint revs campaign to ward off heavy competition

Emphasizes low rates, high fiber-optic quality

By Mitch Betts

U.S. Sprint Communications Co., which combines the communications units of GTE Corp. and United Telecommunications, Inc., has begun operations with an aggressive marketing campaign that stresses the transmission quality of the company's fiber-optic network.

U.S. Sprint debuted as the No. 3 carrier, behind AT&T and MCI Communications Corp., facing a very competitive and challenging marketplace that its parent companies found unprofitable.

The partnership merged the GTE Sprint and U.S. Telecom long-distance companies as well as GTE Telenet and United Telecom's data communications units.

"The merger was a smart move, but whether it's a profitable one remains to be seen," said Edward Goldstein, an analyst with the MAC Group, a consulting firm in Cambridge, Mass. "It's very tough to go up against AT&T and MCI in this business."

U.S. Sprint executives said they hope the appeal of low rates and the largest continuous fiber-optic network will help them take customers away from MCI and AT&T permanently. Charles M. Skibo, a member of the office of the president at U.S. Sprint, said the firm aims to increase its 4% share of the long-distance market to 7% by 1988 and better than 10% in the early 1990s.

Edward W. Carter, senior vice-president for sales and marketing, said U.S. Sprint will offer business customers a WATS Plus service with T1 access, virtual banded WATS and Dial-1 WATS. U.S. Sprint also offers the Telenet data network, a virtual private network, electronic mail and other data communications services.

Prices and other details about the services have not been disclosed, but Carter said those details will be announced sometime this month, with reduced rates effective Aug. 1.

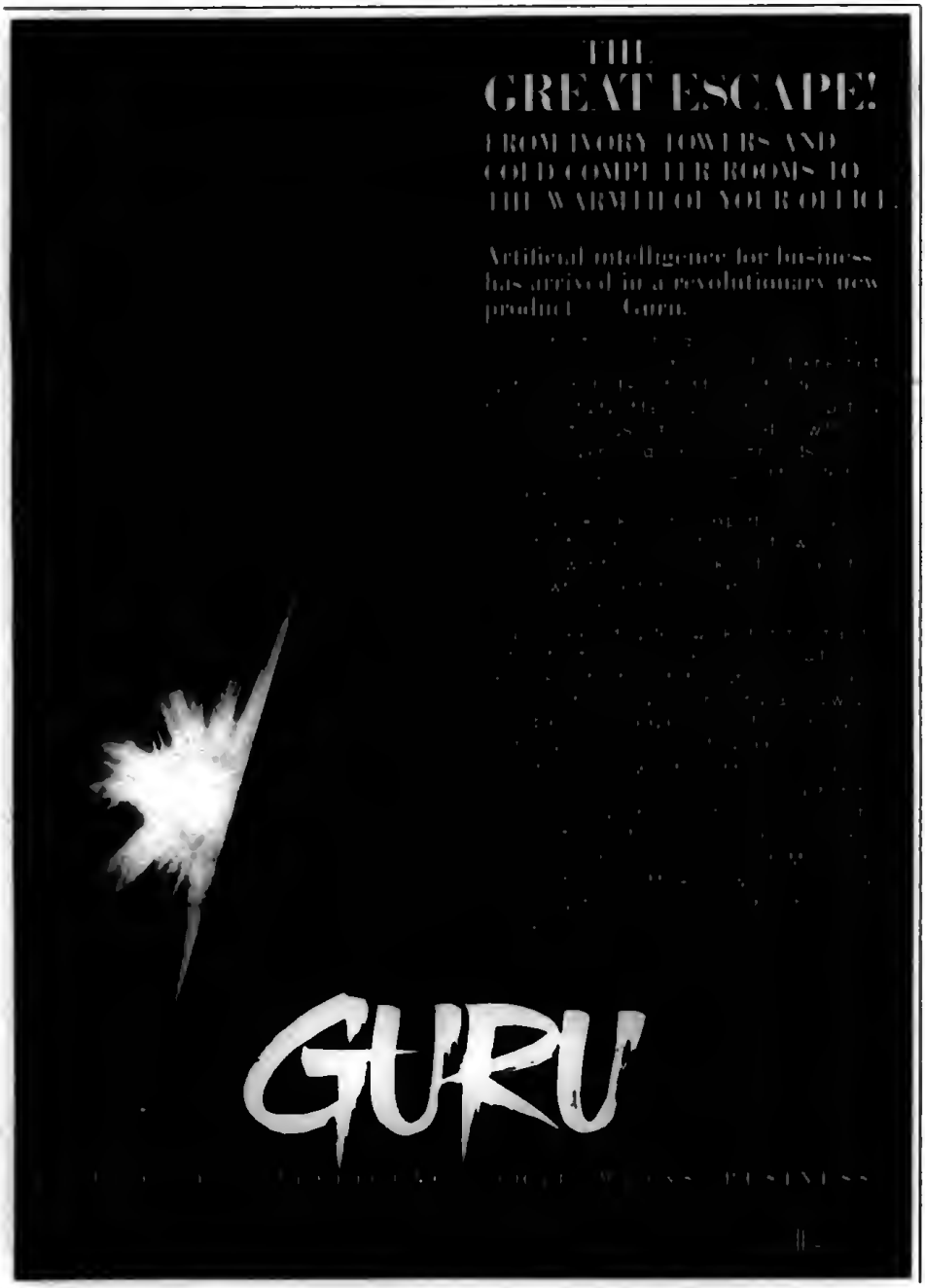
Carter claimed that U.S. Sprint will not only undercut the prices of MCI and AT&T, but will also offer superior quality in voice and data transmissions because of its fiber-optic network. "Price is only half a strategy," Carter said.

Carter said fiber-optic technology reduces static and background noise in long-distance telecommunications and provides security and redundancy features.

U.S. Sprint has in place 5,500 miles of continuous all-digital, fiber-optic cable, the largest continuous fiber network in the U.S. By the end of 1987, the network is scheduled to reach 22,000 miles, according to company officials.

The top executives of U.S. Sprint are J. David Hann, responsible for data communications, and Skibo, responsible for marketing, operations and administration. Prior to the formation of U.S. Sprint, Hann was president of GTE Telenet and Skibo served as president of U.S. Telecom.

Last week, former GTE Sprint President Donald Prigmore voluntarily left U.S. Sprint management for a position with GTE's diversified products group. His departure is expected to strengthen United Telecommunications' role in the management of U.S. Sprint.



Hogan-IBM bells have hollow ring

From page 104

liver a loan system and an international banking system. But the failures were only relative.

What I believe prospects want to see from Hogan today is not a new marketing representative, but a commitment to applications development, implementation support, ongoing enhancements, customer service and some assurance that its financial integrity will ensure a long, healthy future. Is IBM going to provide these things?

One wonders how these marriages are put together and how long they will last. What kind of a marriage is this? Why didn't IBM just buy the company? Is it because the two want to live together for a while to be sure they are compatible?

Hogan and IBM stated a 20-year agreement between the two firms. Perhaps there was a typographical error in expressing the unit of time. My opinion is that the honeymoon will last for perhaps 20 months.

When vendors begin to focus on user benefits as the basis for their strategies, they may in fact find the key to success. Self-serving positioning to enhance one's image may work for micro software, but it will not impress the sophisticated (defined as previously burned) MIS directors of large financial institutions.

When IBM and Hogan return from their honeymoon, I hope they will live a long, happy life together and have lots of kids. But if Hogan stays in Dallas and IBM stays in Armonk and each continues to do its own thing, I am afraid the second chapter will take place in the divorce court.

On September 24 we're covering DEC and you can be part of it.

Announcing the Computerworld Extra on Digital Equipment Corporation.

For several decades, no one has posed a serious threat to IBM's stronghold as the number-one computer manufacturer. But, in the last few years, the company from Maynard, MA, has been quietly consolidating and revamping its product lines, its strategies, its entire organization. And they've set their sights on some very big targets.

In the September 24 Computerworld Extra, we'll take a thorough look at what Digital's got to offer. And why many of the world's large and mid-sized companies are now seriously evaluating DEC.

We'll discuss Digital's strengths. Its top-to-bottom architecture. Its networking and distributed processing philosophies. And the products that connect to IBM — including products that may work better in the IBM environment than IBM's own solutions.

And we'll round out the issue by interviewing Ken Olsen, the man behind the $7 billion corporation.

The Digital story is fascinating. Must reading for our 128,000 paid subscribers. Plus all are the people who will read our Computerworld Extra as it's passed on down the hall. Including large numbers of readers at more than 95% of Digital's installed base of large and mid-sized companies. Plus a major share of the IBM installed base.

Extra copies will also be distributed at DEXPO West '86, Oct. 7-10, in San Francisco.

So, if you've got a product or service that's DEC compatible — or an alternative — our Extra gives you a tailor-made audience. But hurry, closing is August 15.

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IBM, Cybernex dispute settled

From page 134

est in Xerox Corp.'s disk drive subsidiary, Century Data Systems Co. of Anaheim, Calif.

The pending deals, while not mandated by the IBM settlement, will enable Cybernex to remain in business as a disk drive vendor after divesting its thin-film head operation.

A Cybernex spokesman said the firm agreed to the IBM settlement to end what has been a costly and lengthy litigation process. "It was the best option available, and we're not admitting to the allegations," he said.

Disk drive industry analyst James Porter of Disk/Trend, Inc. in Santa Clara, Calif., called Cybernex's moves "a marvelous save" despite the firm's forced departure from the thin-film head business.

"The firm took a broadside from IBM, and suddenly it has a profitable operation in Century Data," Porter noted.

IBM trade secrets

In its 3-year-old suit, IBM claimed that when Cybernex Chief Executive Officer William Klein and four other founders left Big Blue, they took trade secrets relating to thin-film recording head technology used in the high-capacity hard disk drives.

IBM contended that Cybernex, six months after the firm's inception, possessed a production process "virtually identical" to its own, a process that had taken IBM 14 years and $200 million to develop.

Cybernex agreed to stop manufacturing and marketing thin-film recording heads that use or rely on IBM trade secrets. Cybernex must also reimburse salaries paid to Cybernex' founders for the period of time before they left IBM.

Spokesmen for IBM and Cybernex declined to elaborate on the payment terms, citing a confidentiality agreement.

Combining units

Cybernex said it would combine Xerox's 8- and 14-in. disk drive unit, Century Data, long rumored to be on the block, with its affiliate Cybernex Advanced Storage Technology, a maker of high-capacity 5¼-in. hard disk drives.

A Xerox spokesman said Xerox would retain a small interest in the combined company but declined to quantify the amount.

The spokesman added Xerox was selling control of Century Data as part of its 2-year-old strategy to reduce its involvement in the OEM peripherals business.

The firm recently sold a 90% stake in its Optimum optical disk drive subsidiary to Cipher Data Corp. and has divested pieces of its Shugart disk drive operation to two separate Asian concerns during the past two years.

Under terms of the Read-Rite merger, production of Cybernex products will be converted to Read-Rite's process in a 12-month phase-in period. IBM has signed a covenant not to sue Read-Rite after determining Read-Rite's manufacturing process does not infringe on IBM patents.

Old countries, new markets

From page 134

firms. European capital spending, Altman notes, has yet to reflect the worldwide decline in oil prices and will not do so until near year's end.

Well positioned to cash in on European market growth, DeMarcillac says, are West Germany's Nixdorf Computer AG and Siemens AG, Italy's Ing. C. Olivetti & Co. and two U.S. vendors, IBM and DEC.

At DEC, Mark Steinkrauss, director of investor relations, says the international sector contributed

> ***"The international sector's contribution to Digital Equipment Corp. revenue at the end of the third quarter was 40.4%. For the same period in the last two fiscal years, it was only 35%."***

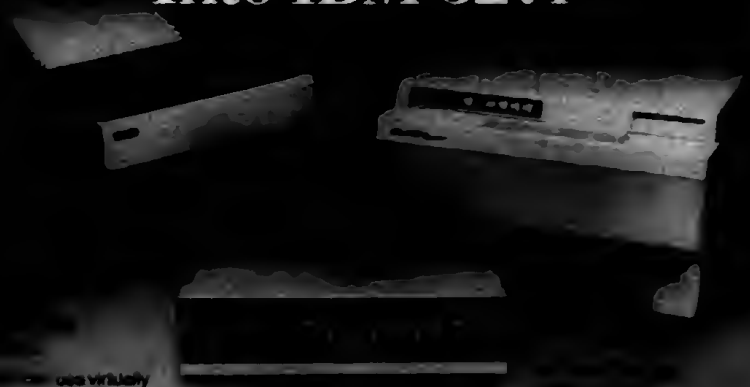
42.7% of DEC's $82.7 million revenue in the third quarter ended March 31. Steinkrauss notes international sales make up a greater proportion of DEC revenue in the third quarter than in any quarter he can recall in his eight years with the company.

For the nine-month period ending with that quarter, the international sector's contribution to DEC revenue was 40.4%. For the same period in the last two fiscal years, it was only 35%.

While Steinkrauss is not able to break out European sales from overall international revenue, he notes that Europe is a strong market in which DEC has seen particular success making sales to the banking and financial services sector.

European sales are often an overlooked part of the DEC success story that has been the talk of the industry for the last nine months. For other firms still adrift in the doldrums of the U.S. computer market, it is a lesson well worth learning.

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"The machine-specific books were not enough, so we decided to try Computerworld. The result was immediate."

David W. Smith
Marketing Services Manager
EMC Corporation
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EMC Corporation manufactures add-in memory and peripheral controllers for IBM, DEC, Hewlett-Packard, Prime and Wang minicomputers and sells them directly to computer users. So the company decided to spread the word to MIS/DP directors by advertising in vendor/machine-specific publications and in Computerworld.

Says David W. Smith, Marketing Services Manager for EMC, Computerworld was chosen for two reasons.

First, EMC selected Computerworld to reinforce the company's message in the minds of readers of machine-specific books and to get to the readers who didn't see the ads in other publications. *"One of our product managers pleaded for greater visibility and recognition for his products — the machine-specific books were not enough,"* recalls David. *"So we decided to try Computerworld, and the result was immediate."*

The second reason is that David has seen Computerworld ranked as the best MIS/DP multivendor book in machine-specific readership studies.

"So many DP shops use more than one machine," he adds. *"Computerworld addresses all markets, and we're getting responses in all five of our vendor categories."*

Since EMC started advertising in Computerworld, the number of phone inquiries actually doubled, David revealed. *"When an ad appears in Computerworld, business picks up tremendously. In fact, Computerworld is responsible for some of our more spectacular success stories,"* he adds. *"Business is coming directly from those ads; people are calling and ordering, and that's something you don't find very often in this business. One caller actually ordered three boards after reading our ad in Computerworld."*

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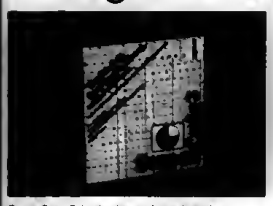
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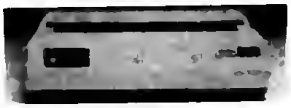
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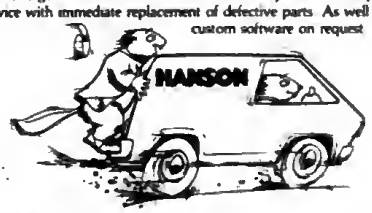
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Computerworld gets better response — in quantity and quality — than many local and national newspapers, according to Mike. "*Computerworld creates an environment that lends credibility and reach. It carries color which beats the dull and boring Sunday classifieds. And that credibility and reach produce quantity and quality that you just won't get from many other newspapers or magazines. Without a doubt, Computerworld is the best in the business,*" he concluded.

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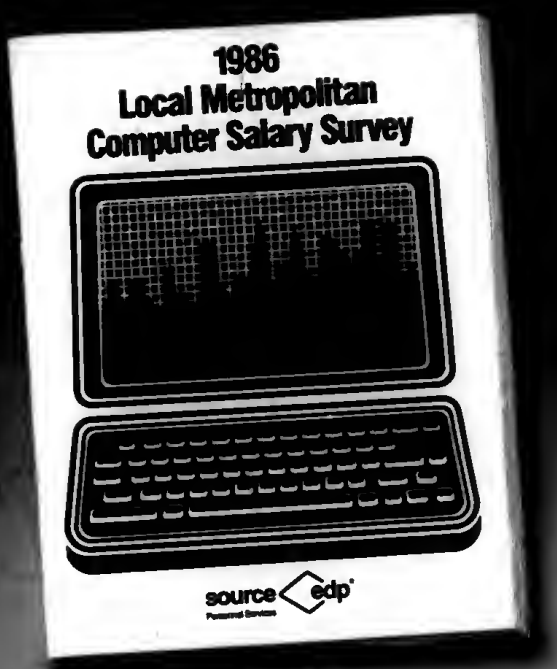
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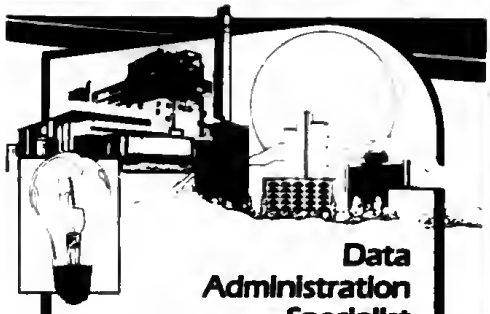
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STC creditors get 80% equity

Deal settles debts owed before Chapter 11 filing

LOUISVILLE, Colo — Storage Technology Corp. (STC) took the first step out from under the veil of bankruptcy last week, announcing an agreement in principle with its creditors' committee that would give creditors 80% equity in STC.

The agreement was unanimously approved by STC's board of directors and effectively settles all of the company's debts before it filed for protection under Chapter 11 of the Federal Bankruptcy Code 21 months ago.

STC now plans to file a reorganization plan in U.S. Bankruptcy Court in Denver. The company said it hopes to have the plan approved by year's end, in line with STC Chairman Ryal Poppa's earlier projections of emerging from bankruptcy (CW, May 26).

The deal appears to be a compromise over earlier proposals presented to the creditors' committee. In May, Poppa said the committee was considering a proposal to give creditors $100 million in cash and $300 million in eight- to 12-year notes, with the balance in equity.

Under the terms of the agreement announced last week, creditors will receive $140 million in cash, $285 million in 10-year notes with a 13.25% annual yield and 80% of STC's postbankruptcy common stock.

— Maura McEnaney

Wang to slash work force

From page 134

Devin said the job cuts will occur in manufacturing, administrative and support positions at most of Wang's U.S. facilities. Positions in sales, marketing, and software and hardware support will not be affected. Devin said the company hopes to increase employment in those areas by roughly 200 people after the reduction of 1,600 is completed.

Wang will encourage employees age 45 and older with five or more years' experience to retire with at least three months' salary and other benefits. In the areas targeted for reduction, other less senior employees will be offered similar incentives. To encourage a fast reduction, Wang is offering an extra four weeks' salary to workers leaving by the end of this week and an extra two weeks' pay for those leaving by Aug. 1.

"Every company has normal attrition on a monthly basis, and we're trying to speed that up," Devin said. "The employees have been very supportive so far and I am sure we will achieve our goals."

"They want to avoid the mistakes of a year ago, such as the doubt and uncertainty among employees and the demoralization that set in," one Wang worker said, contrasting last week's announcement with the 1985 layoffs. Devin said Wang studied the work force reduction methods of industry leaders that do not lay off workers, such as IBM, Digital Equipment Corp. and Hewlett-Packard Co.

Wang's financial struggles result from its inability to translate its word processing prestige into sales of its current product line, according to analyst George Colony of Cambridge, Mass.-based Forrester Research, Inc. Colony said Forrester's April survey of Fortune 1,000 users rated Wang "on a par with DEC and AT&T" and trailing only IBM in quality and customer satisfaction, but that has not been reflected in Wang's bottom line.

"Wang word processing is still the industry standard, but the business is evaporating," Colony said. "If Wang can't compete in office automation and the mid range, the growth curve will stop. It's a marketing problem. There's no clear Wang identity anymore."

AST reduces staff by 7%

From page 134

65 jobs were cut for better productivity, Ashbrook said.

"This is a planned business move, not a reaction to the market," he said. AST employs more than 900 people in its Southern California research and development facilities and five international manufacturing and sales sites.

The revenue of the microcomputer add-on board vendor has declined steadily from $43.6 million to $41 million in the last three quarters. Although still well ahead of results recorded last year, net income fell sequentially from $8.5 million to $6.4 million in the third quarter.

The figures are attributed, both by AST and financial analysts, to a flat personal computer market and tight profit margins. Fourth-quarter 1986 results are not expected for several weeks, but analysts say they expect the downward trend to continue.

Analyst Jon Gruber of Montgomery Securities in San Francisco called the job cut "a very positive move on AST's part" and an appropriate reaction to lower sales volume. He predicted AST revenue will drop to $38 million in the first fiscal quarter of 1987 but added that desktop publishing ventures could pick up sales in the second quarter.

Bret Maxwell of First Analysis Group in Chicago blames IBM's clone-fighting price cuts. "AST must feel it needs to trim to meet that," he said.

AST's products that will be announced in the next few months include a scanner input system, a low-end laser printer and some connectivity products, which will expand AST's role in the desktop publishing market.

Connectivity tools in the works will allow both micros and terminals to share a laser printer, according to Ray Jeter, an AST technical sales instructor. Coaxial connections will be provided for direct IBM 3270 communications and twinaxial connections for IBM's System/36 or 38, Jeter said.

Reasons for a stock buyback may temper its price benefits



ACTIVE ISSUES
Kathy Porteus

How should investors interpret stock buyback programs in technology companies?

A stock buyback occurs when a company purchases up to a preannounced number of its outstanding common shares. Companies that recently repurchased stock include Honeywell, Inc. (HON — 76⅝), IBM (IBM — 145½), NCR Corp. (NCR — 51⅛), Lotus Development Corp. (LOTS — 35½) and Quantum Corp. (QNTM — 17½).

Stock buybacks attract attention because, historically, they have a positive effect on a stock's price. For example, on the day IBM announced it would repurchase up to 10 million, or nearly 2% of its outstanding shares, its stock price rose more than four points.

According to Michael R. Weisberg, director of technology research for Robertson, Colman & Stephens, several studies show that one year after a buyback program, the stock's price appreciation is "very favorable" relative to that of the overall market.

Basically, there are two reasons for this positive reaction. First, buying back stock reduces a company's number of outstanding shares, thereby increasing the earnings each remaining share receives. A company with prospects for higher earnings per share usually piques investor interest.

Second, a company often buys back shares when management considers current prices a bargain based on historic valuation standards or on future business expectations. According to Michael Murphy, editor of "The California Technology Stock Letter," investors take notice of buybacks for the same reasons they watch insider buying.

Although investors initially benefit, stock buybacks can raise longer term questions. Repurchasing stock to take advantage of cheap prices, Weisberg suggests, may be balanced by "changing secular fundamentals that could keep the valuation of technology stocks — relative to that of other emerging growth companies — lower than they have been."

John LeFrere, managing partner with Delta Capital Management, says buybacks are a sign of a mature industry. Normally, a growth company will invest in its future by pursuing new business opportunities or devoting more resources to research and development.

"A company buying back stock," LeFrere says, "is effectively admitting that it won't be growing as fast." The increased return on equity that results from a buyback is not a correct reason investors should pay premiums to the market multiple, LeFrere contends.

Murphy disagrees: "If a company is able to raise money cheaply through debt, turn around and use that money to buy back some stock to earn a higher rate of return, then that is good for shareholders."

Before determining what's good and what isn't, shareholders should carefully evaluate the reasons behind a stock buyback program. According to LeFrere, AMP, Inc. (AMP — 37⅝) has a consistent buyback policy for its employee stock plan, so its buyback does not indicate slower growth expectations. But small capitalization companies, such as Quantum, generally warrant further examination, LeFrere says.

Another example, NCR, has had excess cash, and buying back stock is one way to invest it. This benefits NCR shareholders and provides lower taxes on such gains than would be the case with increased dividends.

IBM has regularly repurchased stock for its employees and probably bought back twice the usual number of shares this year because management believes the stock is undervalued. Companies also repurchase stock as an antitakeover measure or as a means of pumping the stock to obtain a better sale price.

Investors must not only evaluate individual stock buyback programs, but also recognize that positive market reaction to a buyback is accompanied by longer term issues.

Porteus is president of Strand Research Associates, a Centerville, Mass.-based company that provides customized research services for financial and high-tech firms.

DCA boasts 90% earnings increase

By James A. Martin

ALPHARETTA, Ga. — Digital Communications Associates, Inc. (DCA) last week reported a 90% earnings increase for fiscal-year 1986.

DCA earned $20.6 million, compared with $10.8 million for fiscal 1985. Sales for the year, which ended June 30, were $137.8 million, a 39% increase over the previous year's $99.2 million. Earnings per share were $1.80, compared with $1.06.

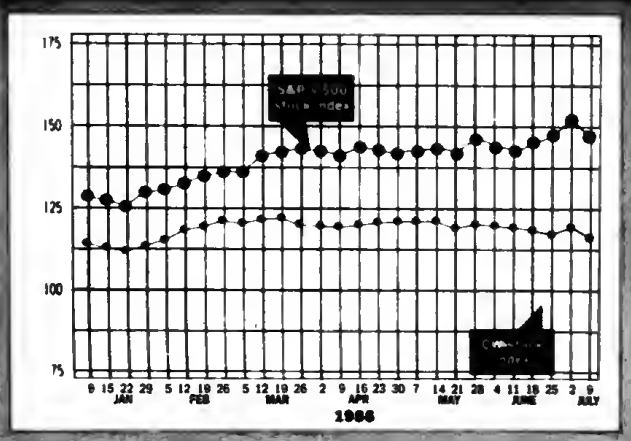
For the fourth quarter, net income rose to $5.7 million, or 47 cents a share, from $3.3 million, or 33 cents a share, a 70% increase. Sales were $34.6 million, compared with $31.7 million, an increase of 9%.

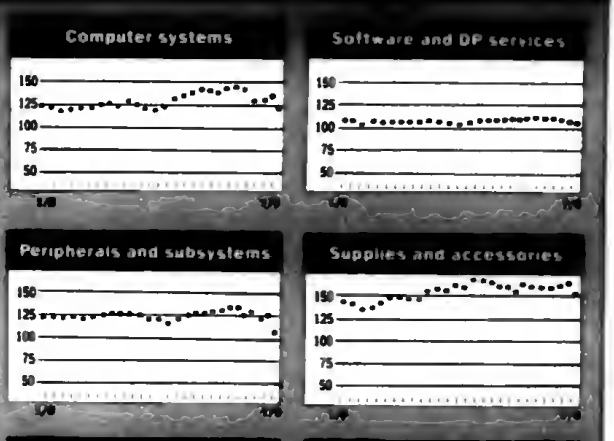
The fourth-quarter and fiscal-year results were "far better than management had implied earlier," said Andy Schopick, vice-president and senior analyst at Gartner Securities Corp. in Stamford, Conn. "DCA is an extremely well managed company, especially financially and in product positioning," Schopick said.

COMPUTER INDUSTRY

MITCHELL J. HAYES

Computerworld stock trading index





All indexes reflect a market value of 100 on Dec. 31, 1985, and track stock market performance in relation to that base. The CW stock index represents the composite weighted performance of the 66 companies in the computer industry sample.

	7/2/86	7/9/86
Computer systems	126.7	**121.7**
Software and DP services	105.9	**104.9**
Peripherals and subsystems	124.1	**104.9**
Supplies and accessories	155.6	**150.1**
Semiconductors	93.0	**88.9**
Leasing companies	104.2	**103.9**
CW stock index	117.6	**113.8**
Standard and Poor's 500 stock index	151.1	**148.2**

Computerworld stock trading summary

CLOSING PRICES WEDNESDAY, JULY 9, 1986

EXCH		52 WEEK RANGE (1)	CLOSE JULY 9 1986	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
O	ALPHA MICROSYSTEMS	5- 9	5 3/8	3/8	6.2
O	ALTOS COMPUTER SYST	9- 19	13 3/4	5/8	4.3
A	AMDAHL CORP	10- 19	17	-1 1/8	-6.2
O	APOLLO COMPUTER	9- 31	12 5/8	1 3/8	9.8
O	APPLE COMPUTER INC	14- 39	34 5/8	1 1/2	4.1
N	AT&T	19- 36	24 1/2	-5/8	-2.4
N	BURROUGHS CORP	52- 71	70	+2 1/2	+3.7
O	COMPAQ COMPUTER CP	5- 19	13 3/8	-1 1/8	-7.7
O	COMPUTER AUTOMATION	1- 9	3		+2.1
A	COMPUTER CONSOLES	5- 14	9	3/4	7.8
N	CONTROL DATA CORP	15- 39	23 1/2	+1	+4.4
O	CONVERGENT TECHNOL	5- 13	7 1/4	-1/2	-6.4
O	CPT CORP	4 9	4 3/8	+1/8	+2.9
N	CRAY RESEARCH INC	25- 97	89 1/2	-7 7/8	-8.0
O	DAISY SYSTEMS CORP	10- 38	9 3/4	1 1/4	-11.3
N	DATA GENERAL CORP	31- 79	34	1	-2.8
N	DATAPOINT CORP	5- 22	7 1/8	-7/8	10.9
N	DIGITAL EQUIPMENT	42- 91	88 1/2	0	0.0
A	EECO INC	13- 20	18 7/8	1/8	-0.6
N	ELECTRONIC ASSOC	3- 7	4 7/8	3/8	-7.1
N	FLOATING POINT SYST	18- 42	34 1/2	-3 3/8	-8.9
N	FOXBORO	22- 31	26 1/2	-1 7/8	-6.1
N	GOULD INC	20- 38	21	-1	-4.5
N	HARRIS CORP	22 36	36 3/8	+3 3/4	+11.4
N	HEWLETT-PACKARD CO	29- 46	41 3/8	7/8	-2.0
N	HONEYWELL INC	54- 87	73 1/2	-3 1/4	-4.2
N	IBM	117- 158	144 1/4	-5 1/4	-3.5
O	IPL SYSTEMS INC	1- 4	3	-3/8	-11.1
N	ITT CORP	28- 57	54 3/4	-2	-3.5
N	M/A COM INC	13- 24	15 3/4	1 1/2	8.8
N	MANAGEMENT ASSIST	2 29	2 1/2	0	0.0
N	MATSUSHITA ELEC(ADR)	49- 88	81 7/8	-5 3/8	-6.1
O	MENTOR GRAPHICS	13- 30	15 1/8	-3/8	-2.4
N	MOHAWK DATA SCI	1 13	2 3/8	-1/4	-9.5
N	NBI INC	11- 20	11 1/4	1 1/4	-10.0
N	NCR	25- 56	52 3/8	1/8	-0.2
N	PERKIN-ELMER	22 36	27 5/8	-5/8	-2.2
N	PRIME COMPUTER INC	15- 27	17 7/8	-1	-5.2
N	SPERRY CORP	39- 76	75 1/8	-3/4	-0.9
O	STRATUS COMPUTER INC	9- 25	20 3/4	3/4	3.4
O	TANDEM COMPUTERS INC	13- 34	31 3/4	-5/8	-1.9
N	TANDY CORP	24- 44	36	-2 3/4	-7.0
O	TELEVIDEO SYSTEMS	2- 4	2 7/8	-1/8	-4.1
O	TELXON CORP	15- 24	22	-1 1/2	-6.3
N	TEXAS INSTRUMENTS	86- 141	119 7/8	+1/2	+0.4
A	ULTIMATE CORP	6- 34	35 3/8	-1 7/8	-5.6
O	VECTOR GRAPHICS INC	1- 1	1/8	0	0.0
A	WANG LABS "B"	15- 29	14 5/8	1/4	1.5
A	WANG LABS "C"	14- 29	14 1/4	-3/4	-5.0
N	XEROX CORP	37- 72	55 1/2	-1 7/8	-3.2
	SUPPLIES & ACCESSORIES				
N	AMERICAN BUS PRODS	21- 35	32 1/8	-1	-3.0
N	BARRY WRIGHT	17- 29	19 1/8	-2 1/2	-12.1
A	DUPLEX PRODUCTS INC	13- 22	20 3/4	-1/4	-1.1
A	ENNIS BUS. FORMS	14- 28	25 3/8	-7/8	-3.3
N	3M COMPANY	74- 114	109 1/8	-4 7/8	-4.2
N	MOORE CORP LTD	15- 27	25 3/4	-1/4	-0.9
O	STANDARD REGISTER	22- 45	40	0	0.0
N	WALLACE COMP SERVICE	30- 46	46 3/4	-1 7/8	-3.8

EXCH		52 WEEK RANGE (1)	CLOSE JULY 9 1986	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & CP SERVICES				
O	ADVANCED COMP TECH	2 9	4 7/8	1/2	9.3
N	ADVANCED SYSTEMS INC	9- 20	17 1/2	-1	-5.4
N	AGS COMPUTERS INC	10- 25	19 1/8	1 3/4	-8.3
O	AMERICAN SOFTWARE	9- 15	11 1/2	1 1/2	11.5
N	ANACOMP INC	5- 11	5 1/2	0	0.0
O	ANALYSTS INTL CORP	2- 8	5 3/8	5/8	10.4
O	ASHTON TATE	6- 34	25 1/4	3 5/8	12.5
O	ASK COMPUTER SYSTEMS	7- 25	10	-1 1/8	10.1
B	ASTRADYNE COMP IND	1 3	1 1/4	1/8	8.6
N	AUTOMATIC DATA PROC	19- 39	34	-1 3/4	-4.8
O	COMPUTER NETWORK	5 9	7 5/8	1/4	3.1
O	COMPUTER ASSOC INT'L	9- 26	22	-3	-12.0
O	COMPUTER HORIZONS	5- 13	11 3/8	1 1/4	9.9
N	COMPUTEN SCIENCES	13- 30	35 3/8	3 3/4	9.5
O	COMPUTEN TASK GROUP	7- 19	12 3/4	1/2	3.7
O	COMPUTER USAGE	1 3	2 1/8	0	0.0
O	COMPUTONE SYSTEMS	3- 11	7	-1/2	-14.2
O	COMSERV CORP	1- 8	2 1/2	3/4	23.0
O	COMSHARE	7 13	12 1/2	1/2	3.8
N	CULLINET SOFTWARE	12- 33	12 1/8	7/8	-6.7
O	CYCARE SYSTEMS INC	13- 27	13 7/8	1/4	-1.7
O	HOGAN SYSTEM INC	4- 12	10 5/8	1/2	-4.4
N	GENERAL ELECTRIC CO	56- 82	76 5/8	-4 3/8	5.6
N	GENL MOTORS E (EDS)	20- 49	44 7/8	3 1/8	-6.5
N	GTE CORP	38- 56	53 1/8	2 1/4	-4.0
O	INFORMATION SCIENCE	1- 5	3	1/4	7.6
O	INFOTRON SYSTEMS CP	13- 24	15	-1/4	-1.9
O	KEANE ASSOCIATES	10- 20	14 1/4	7/8	-5.7
N	LOGICON	25- 43	31 1/8	-2 1/8	-6.3
O	LOTUS DEVELOPMENT CP	15- 38	34 3/4	-2 1/2	-6.7
O	MCI COMMUNICATIONS	7 13	9 7/8	-1/2	-4.8
O	MINGT SCI AMER INC	7- 18	13 3/8	1/4	1.8
O	MATHEMATICAL APP GRP	1- 9	1/2	0	0.0
O	MICOM SYSTEMS INC	12- 36	12 1/4	-1/2	3.9
O	MICROPRO INT'L CP	2- 4	1 7/8	1/8	-11.4
O	NATIONAL DATA CORP	6- 25	19 3/8	-2 3/8	-11.4
O	ON-LINE SOFTWARE INT	4- 18	13	-3/4	-5.4
N	PANSOPHIC SYSTEMS	14- 36	36 3/8	-2 1/4	-7.3
N	PLANNING RESEARCH	11- 23	18 5/8	-1/2	-2.8
O	POLICY MGMT SYSTS CP	18- 35	17 1/4	1 1/2	9.0
O	PROGRAMMING & SYS	4- 10	9 7/8	0	0.0
O	REYNOLDS & REYNOLD	30- 65	31 3/4	-1	-3.0
O	SEI CORP	13- 27	18 1/2	-1 1/2	-8.3
O	SHARED MEDICAL SYST	26- 38	33	2 1/2	7.0
O	SCIENTIFIC COMPUTERS	4- 9	4 1/2	0	0.0
O	SOFTWARE AG	12- 22	19 1/4	1/8	-0.9
N	URS CORP	10- 18	16 1/2	-3/4	-4.9
N	UCCEL	11- 23	19 1/4	-2 3/8	-10.9
O	VM SOFTWARE	17- 31	29 1/2	-2 3/4	-9.7
	SEMICONDUCTORS				
N	ADVANCED MICRO DEV	16- 35	19 3/4	-1 1/4	-6.2
O	ADV D SEMICONDUCTOR	7 23	9 1/2	-1/2	5.5
N	ANALOG DEVICES INC	14- 24	18 7/8	-1 1/2	-8.1
O	ANALOGIC CORP	11- 18	11 1/4	1 1/4	10.0
N	APPLIED MAGNETICS CP	6- 18	18	-7/8	-5.1
O	AVANTEK	17 26	17 1/8	1 3/8	7.4
O	HADCO CORP	3- 7	5 1/8	-1/4	-4.8
O	INTEL CORP	21 33	21 1/2	-1	-4.4
O	MICRO MASK INC	4 12	3 1/2	1 1/4	26.3
N	MOTOROLA INC	29- 48	37 1/8	-3/4	1.9
N	NAT'L SEMICONDUCTOR	10- 15	11 1/8	1/2	-4.3
N	TERADYNE	17 33	21 1/8	-1 3/8	-7.1

EXCH		52 WEEK RANGE (1)	CLOSE JULY 9 1986	WEEK NET CHNGE	WEEK PCT CHNGE
	PERIPHERALS & SUBSYSTEMS				
P	AM INTERNATIONAL	3- 9	9 7/8	+1/8	+1.8
A	ANDERSON JACOBSON	2- 5	2 1/8	1/8	5.5
O	AST RESEARCH INC	7 33	14	3/8	2.6
O	AUTO-TROL TECHNOLOGY	3- 13	4	1/8	-3.0
O	AVANT-GARDE COMPUTING	3- 21	3 3/8	3/8	-15.6
O	BANCTEC INC	9- 13	9	1	11.1
O	BEEHIVE INT L	1- 2	1/8	0	0.0
N	BOLT,BERANEK & NEW	20- 46	42	-1 1/4	2.8
O	CAMBEX CORP	1 3	1	0	0.0
N	CENTRONICS DATA COMP	3- 11	8 5/8	+1/8	+1.9
A	CETEC CORP	6- 9	7 1/8	1/8	1.7
A	COGNITRONICS	4- 7	3 7/8	0	0.0
N	COMPUGRAPHIC CORP	20- 36	19 1/2	0	0.0
O	COMPUTER TRANSCEIVER	0- 1	3/4	0	0.0
N	COMPUTERVISION CORP	8- 44	13 3/4	3/4	-5.1
N	CONRAC CORP	12 19	15 3/4	-5/8	3.8
A	DATAPRODUCTS CORP	11 20	14 7/8	+1/4	+1.7
A	DATARAM CORP	4 17	7 5/8	7/8	10.2
O	DATA SWITCH CORP	4- 9	8 3/8	3/8	5.5
O	DATUM INC	5- 9	5 3/8	-3/4	12.2
O	DECISION IND CORP	10- 20	11 7/8	-1 1/4	-9.5
O	ENDATA, INC	2- 8	8 3/8	3/8	5.5
O	EVANS & SUTHERLAND	12- 27	21 1/2	1/2	-2.2
O	GANDALF TECHNOLOGIES	5- 13	9 3/8	-1/8	1.9
N	GEN L DATA COMM IND	6- 21	10 3/4	1 3/8	11.3
N	HAZELTINE CORP	17 20	18 1/2	1 5/8	-8.0
O	ICOT CORP	3- 12	10 1/8	7/8	7.9
O	INFORMATION INTL INC	10- 17	16	1/4	-1.5
O	INTECOM INC	3- 11	4 5/8	-3/8	-7.4
O	MEGADATA CORP	3- 9	3 5/8	0	0.0
A	MSI DATA CORP	7- 14	11 1/2	-1 1/2	-11.5
N	NASHUA CORP	12- 27	24 1/8	7/8	-3.5
O	NETWORK SYSTEMS CORP	11- 27	12 1/8	-1 1/8	-8.4
N	NO AMERICAN PHILIPS	32 47	42 3/8	-2 1/2	-5.5
N	NORTHERN TELECOM LTD	28- 41	28 7/8	3/8	-1.2
O	OMEX	1 3	1/2	0	0.0
N	PARADYNE CORP	6- 18	7 3/4	5/8	7.4
A	PENRIL CORP	9- 14	8	1/4	-4.0
N	PLESSEY CO (ADR)	19- 38	33 1/4	-3/4	-2.2
O	PRINTRONIX INC	9- 18	13	1/4	1.8
O	QMS INC	9- 19	13 1/2	-1 5/8	-9.2
O	RAMTEK CORP	2 7	3 1/2	3/8	-6.3
N	RECOGNITION EQUIP	5- 17	11 1/2	7/8	7.0
N	SANDERS ASSOCIATES	29- 57	56 3/4	+2 3/4	+5.0
O	SCAN-TRON CORP	9- 24	20	-3 1/4	-13.9
N	SCIENTIFIC ATLANTA	10- 15	10	-1/8	1.2
O	SEAGATE TECHNOLOGY	5- 13	10 7/8	3/4	-6.4
N	STORAGE TECHNOLOGY	1- 5	3 1/2	3/8	9.9
O	TALLEY DATATRONICS	0- 2	1/4	1/16	-8.2
A	T BAR INC	5- 9	5 3/8	1/2	-8.5
A	TAB PRODUCTS CO	9- 15	13 1/4	3/4	5.3
O	TANDON CORP	3- 9	9 1/8	0	0.0
A	TEC INC	4- 13	4 1/4	0	0.0
N	TEKTRONIX INC	47 68	59 1/8	7/8	1.4
N	TELEX	34- 68	55 3/4	2 1/4	3.8
O	TESDATA SYSTEMS CP	0- 3	1/2	+1/8	+50.1
N	TIMEPLEX INC	16- 23	19	-5/8	-3.7
N	TITAN CORP	4- 11	9 7/8	1	10.1
O	VISUAL TECHNOLOGY	1- 3	1/2	0	0.0
	LEASING COMPANIES				
N	COMDISCO INC	7- 24	20	2	9.0
N	CONTINENTAL INFO SYS	6- 12	10 5/8	1 1/4	10.5
O	FINALCO GROUP INC	3- 8	3 1/2	+1/4	+7.8
O	PHOENIX AMERICAN INC	2- 8	3 7/8	+1/8	+3.3
O	SELECTERM INC	9- 12	9 3/4	-3/4	10.0
N	U S LEASING	32 46	42	+3/4	+1.8

EXCH: N = NEW YORK, A = AMERICAN; P = PACIFIC, B = BOSTON, L = NATIONAL, M = MIWEST, O = OVER THE-COUNTER, S = SPLIT

T-C PRICES ARE BI PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

COMPUTER INDUSTRY

INSIDE

Software Research Corp.'s start-up woes have hindered the success of its multivendor connectivity software/**103**

A financial software consultant doubts the value of the IBM-Hogan Systems partnership/**104**

U.S. Sprint has debuted with splashy marketing that emphasizes fiber-optic quality/**106**

Storage Technology agreed in principle to give its creditors 80% equity when the company emerges from bankruptcy/**132**

INSTANT ANALYSIS

"It was sort of one of these very personal kinds of self-examinations which I am given to and have always been given to."

— Mitchell D. Kapor on his decision to resign as chairman of Lotus Development Corp.

Wang to slash work force

'Voluntary separations,' early retirements planned

By Clinton Wilder

LOWELL, Mass — Unable to generate significant sales momentum for the past 12 months, Wang Laboratories, Inc. said last week that it will eliminate 1,600 jobs, mainly through voluntary means.

Except for the layoff of 220 employees at an Office Information System (OIS) manufacturing plant in Puerto Rico, all of the job cuts will be accomplished by early retirement incentives and a "voluntary separation" program. The reduction of the worldwide work force to 30,000 people is expected to be completed by Aug. 31, reducing annual expenses by approximately $48 million, said Ed Devin, Wang's senior vice-president for human resources.

The announcement came some 13 months after Wang laid off 1,600 workers before posting a $109 million loss, its worst ever, in the fourth quarter of fiscal 1985. Despite that work force reduction, the formerly high-flying office automation pioneer has yet to record more than modest profits in subsequent quarters.

Plagued by top management defections, service complaints and an uncertain corporate direction, Wang has appeared to falter in making the transition from word processing pioneer to full-service data processing vendor.

"We see a real mixed feeling about Wang in its installed base," said Tim Caffrey, a minicomputer analyst with Framingham, Mass.-based International Data Corp. "The need to cut the work force again shows that Wang's long-term inability to improve sales and service is having some impact. A lot of people are just fed up, and in this type of economy that hurts significantly."

Wang Chairman and President An Wang announced separately last week that the company will report a small profit for the fourth quarter ended June 30. The forecast represented a slight improvement from the break-even results Wang projected last month, when the company said it was planning to cut additional jobs. [CW, June 30]

See **WANG** page 132

IBM, Cybernex dispute settled

By Alan Alper

ARMONK, N.Y. — Continuing its aggressive litigation strategy to protect proprietary technology, IBM last week reached an out-of-court settlement with a small disk drive and recording head vendor accused of using IBM trade secrets.

Cybernex Corp. of San Jose, Calif., founded in 1981 by five former IBM employees, agreed to pay an undisclosed multimillion dollar sum to IBM. Cybernex also agreed to several other provisions, including the destruction of inventories that utilized the allegedly infringing thin-film head technology.

In the past three years, IBM has threatened to sue or actually sued a number of companies that it contended misappropriated its technology, including Hitachi Ltd. of Japan.

Separately, Cybernex agreed last week to merge its recording head operation with competitor Read-Rite Corp. of Milpitas, Calif., and also to acquire controlling inter-

See **IBM** page 109

AST reduces staff by 7%, schedules release of products

By Peggy Watt

IRVINE, Calif. — On the verge of releasing a host of new desktop publishing products, AST Research, Inc. annnunced last week that it laid off 7% of its work force.

The reduction in force, which eliminated 65 positions immediately, was implemented in response to an expected revenue drop in the fiscal year that ended in June, said Jim Ashbrook, vice-president of AST's recently formed personal workstation enhancements group.

Ashbrook said it was too early to count on offsetting the decline with new business from the upcoming product releases. "We're trying to balance our resources for our new ventures," he said.

While AST expects eventually to add positions to its new areas of development, including its communications and systems groups and units for Apple Computer, Inc. and Digital Equipment Corp. products, the

See **AST** page 132

INDUSTRY INSIGHT
Edward Warner

Old countries, new markets

When IBM, Digital Equipment Corp. and other heavyweights of the U.S. computer industry release their quarterly earnings reports this week and next, the reports will likely show international sales contributing more than ever to revenues — and European sales will be found leading the pack.

Europe is a hot market for U.S. vendors because of the dollar's decline in value against European currencies. In addition, analysts say the European computer market's growth has continued largely unabated throughout the duration of the U.S. computer industry slump.

According to Philip DeMarcilliac, European research manager for the London office of International Data Corp., the dollar value of the European computer market grew 14% last year. If the dollar drops in value by an additional 5% against the majority of European currencies, he says, U.S. vendors will see 20% to 25% growth in their European markets this year.

What causes the European market to perk, while the U.S. market remains relatively tepid? A simple explanation, according to Susan P. Douglas, New York University professor of marketing and international business, is that the "economies in most major European countries are on the upswing at the moment."

That upswing has been reflected in capital spending, she says, a point echoed by David Altman, an investment analyst with Goldman Sachs & Co. As Altman explains it, "European capital spending has a longer term horizon than it does in the U.S."

In addition, the impact of an economic event often takes longer to be reflected in the buying patterns of European

See **OLD** page 109

Warner is editor of the Computerworld News Service.

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